REPORT TO THE FAA

CONFIGURATION MANAGEMENT STEERING GROUP

CONFIGURATION MANAGEMENT INFORMATION NEEDS and SOURCES

Prepared by the CM Information Management Team

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EXECUTIVE SUMMARY

Configuration management (CM) is a discipline that facilitates the design management of a system or product over time through the establishment of baselines, related documentation and the status accounting of key aspects during its evolution. Accurate, timely and reliable CM information is fundamental to the effective life-cycle management of the National Airspace System (NAS). This report identifies the top-priority CM information needs of agency stakeholders and the information management policies, principles and practices necessary to satisfy those needs.

The Configuration Management Steering Group (CMSG), the FAA's advisory board for CM policy and its implementation, chartered a CM Information Management Working Group in April 1998 to develop proposals for improving CM information management in the agency.

Over the years, information accessibility, accuracy and reliability have been major concerns in the FAA's execution of CM. Earlier Agency studies focused on broad CM process and policy issues, with no subsequent plans to improve CM information management specifically. The CM Business Process Re-Engineering effort, completed in 1996, did establish a vision and notional technical environment for managing information. However, the effort remained focused at a high level.

In early 1997, the CMSG chartered a group of CM professionals from ARA and ATS, known as the CM Core Team, to update the agency's CM Implementation Plan. The lack of an FAA life-cycle CM process was a key issue to the Core Team, so they held a national off-site at the TRW site in Fair Lakes Virginia to address process and related policy and information management issues. The Core team provided a briefing to the CMSG that highlighted the off-site findings. This briefing included a number of issues they felt were significant impediments to effective CM in the agency. One of the eight areas of concern was the management of CM information. The specific issues reported included the following:

- Documented changes are not implemented
- Implemented changes are not documented
- Distribution of CM data is limited
- Baseline data is not accessible by all organizations
- Baselines are not audited for accuracy
- Validation of CM baselines has not been accomplished

The CM Core Team recommended that the FAA:

- Define CM information needs;
- Develop an FAA CM information architecture to guide CM information management activities; and
- Leverage information technology, where appropriate.

The CM Information Management (CMIM) Working Group was then established in April 1998 to develop more detailed "actionable recommendations" for improving CM-related information

management (see Appendix A for membership). This Working Group recommended that the FAA:

- Develop an FAA Corporate Intranet Site;
- Conduct an Information Needs Survey;
- Conduct an Information Sources Survey;
- Establish an inventory of available industry and government standards pertinent to the execution of CM in the FAA. Consider mandating selected standards to meet FAA's CM information management needs;
- Develop and publish a CM Information Resources Catalog;
- Finalize CM automated tool requirements and conduct a pilot effort;
- Develop an "as-is" CM information architecture;
- Conduct gap analysis;
- Develop an enhanced (next phase) CM information architecture; and
- Develop an implementation plan to meet the enhanced architecture.

This report provides the findings of the information sources survey that was distributed to all CMSG members. In addition, the CMIM Working Group conducted on-site interviews in FAA Headquarters, Central Region, Southern Region, the Mike Monroney Aeronautical Center and the William J. Hughes Technical Center. The primary objectives of this CM Information Needs Report are to:

- Identify major, cross-cutting CM information needs throughout the FAA;
- Document current information sources and document concerns regarding the accessibility, reliability, and timeliness of these sources;
- Define those things FAA must do right (policy and process) to ensure success;
- Identify the obstacles or inhibitors that prevent the FAA from achieving efficient and effective CM information management;
- Identify both internal and external factors that impact CM information management; and
- Highlight strategies that can help the FAA meet its CM information management needs.

The major findings of these interviews can be grouped into seven high-level CM information "requirements." They are (as numbered in the report):

2.1. The ability to identify and communicate the existing operational configuration of NAS hardware, down to the Lowest Reportable Unit (LRU) level, and NAS software systems.
2.2. A process that provides all necessary information necessary to efficiently and effectively manage change proposals to the National Airspace System (NAS).
2.3. More timely access to CM-specific documentation, supporting documentation and CM basic information to execute CM and program management responsibilities.
2.4. Easily accessible and accurate drawings of commissioned sites and equipment.
2.5. An accurate and responsive FAA life-cycle corporate status accounting system.
2.6. Traceability from the NAS-level requirements to actual configuration items.
2.7. Other information to ensure efficient and effective CM operations.

For each requirement, this report provides:

- A brief statement of each major requirement;
- Some discussion that amplifies the requirement statement and related issues;
- Specific interview findings;
- CM information needs expressed by interviewees; and
- Initiatives that should be considered to improve CM information management.

Some of the major information management improvement needs include:

- A closed-loop NAS change management process. Information generated throughout the process must be linked across related, but currently uncoordinated processes (i.e., requirements, specification, change proposal, change decision, change authorization and change implementation processes).

- An FAA information architecture to identify information sources, identify and resolve gaps, and leverage information across organizations and existing databases across the agency.

- A short, medium and long-term process improvement strategy to ensure a comprehensive and integrated modification tracking system (process, procedures and infrastructure support). A system to capture, maintain and communicate the evolving configuration of NAS hardware and software systems and sub-systems (versions and revisions) down to the LRU level (as defined by the requirements of each system). This system should include guidelines, processes, procedures, data naming conventions and standards, new/revised automated tools, databases, etc. Any approach must limit technician and other stakeholder intervention (i.e., limited keystrokes). NIMS, bar-coding systems, etc. are capabilities that should be factored into this approach.

- Improved linkage between documents, decisions and direction (e.g., between NAS Requirements, Master Configuration Index (MCI), NCPs, CCD's, change authorizations, mod tracking, etc.).

- An integrated agency-wide infrastructure (process, business rules, automated tools, communications, documentation repositories) to facilitate NCP development, review, tracking and approval.

- An agency-wide CM document management strategy to guide the creation, maintenance and dissemination of CM and CM-related information. The strategy must define clear roles and responsibilities for corporate (i.e., DCC), IPT, AOS, Regional and other organizations, identify "corporate" information assets that are needed consistently across organizations, and the infrastructure to be used to make such information available to customers.

- A nationally accepted and available system that provides CM stakeholders with all data required to perform status accounting activities on corporately maintained data. Such a system must overcome the non-intuitive nature of DOCCON, offer rapid response time during

data entry sessions, and capture data identified by all organizations that use it. The system should also provide immediate access to substantially more data than is available through current mainframe systems, e.g., on-line documentation and NCP forms.

- Updated and consistent FAA CM guidance and standards for information management (i.e., operational procedures, electronic format for documents and drawings, drawing interchange standards). Standards should be imposed on FAA contracts to facilitate the management and sharing of information.

- Minimum set of Contract Deliverable Requirements Lists (CDRLs) and Data Item Descriptions (DIDs) for CM purposes, including Engineering Change Proposals (ECPs), Specification Change Notices (SCNs), Notices of Revision (NORs), Functional Configuration Audits (FCAs) and Physical Configuration Audit (PCAs), Plans and Reports, status accounting CDRLs and DIDs, drawing packages, technical data packages and nameplates.

- Traceability of system and sub-system information throughout the life-cycle in agency life cycle documentation (i.e., requirements, specifications, NCPs, ICDs CCDs, change authorization documents, and modification tracking systems.

Now that we have more specifically identified customer needs, the CMIM Working Group recommends the following as next steps:

Integrate this work with other efforts…..

- Share this information with the CM Process, Policy and Resources Working Groups. Integrate this CMIM work with these other efforts, establish priorities, and develop an implementation plan.

Move forward with other CMIM initiatives to improve information accessibility, reliability and timeliness……..

- Provide greater access to existing information through the FAA CM Intranet Home Page, tailored reports in DOCCON and others as appropriate. Focus first on that information highlighted in the interviews and broaden the scope as time and resources permit;

- Complete an “as-is” CM information architecture;

- Conduct gap analysis (i.e. balance stated needs and issues against the current “as-is” information environment and the agency CM enterprise model (life cycle process model));

- Develop strategies to resolve information gaps;

- Share this information with the CMSG and gain feedback (i.e., priority of efforts);

- Develop top-level implementation plans for the top selected strategies;

- Obtain CMSG concurrence on the plan (including the dedication of resources);

- Implement approved plans; and

- As time and resources permit, pursue lower-level strategies.

Some of the major obstacles or inhibitors to improved CM information management are:

- Senior Management Support
- Resources
- Institutionalizing the new CM process
- FAA's technology infrastructure
- Moving to a Commercial Off-the Shelf (COTS) environment
- Policy implementation and enforcement

For future reference, a binder is being developed that will have all the source information that supports this report.

Sound CM information management is not a cost but an investment. We simply cannot afford to continue business "as usual." Our interviews clearly reiterated the safety and operational risks of not doing sound CM. FAA organizations should use the CMIM objectives and initiatives from this report to establish CM activities, resource priorities and program plans.

1. INTRODUCTION

1.1. Background

The Configuration Management Steering Group (CMSG) of the Federal Aviation Administration chartered a group of CM professionals from ARA and ATS, known as the CM Core Team, to update the agency's CM Implementation Plan. During that review, the CM Core Team identified a number of issues they felt were significant impediments to effective CM in the agency. One of the eight areas of concern was the management of CM information. The CM Core Team identified the following corporate CM information issues:

- Documented changes are not implemented
- Implemented changes are not documented
- Distribution of CM data is limited
- Baseline data is not accessible by all organizations
- Baselines are not audited for accuracy
- Validation of CM baselines has not been accomplished

The CM Core Team recommended that the FAA:

- Define CM information needs
- Develop an FAA CM information architecture to guide CM information management activities; and
- Leverage information technology, where appropriate.

The CM Information Management (CMIM) Working Group was then established and charged with the responsibility of developing more detailed "actionable recommendations" to improve CM information management. (see Appendix A for membership). This Working Group recommended that the FAA:

- Develop an FAA Corporate Intranet Site;
- Conduct an Information Needs Survey;
- Conduct an Information Sources Survey;
- Establish an inventory of available industry and government standards pertinent to the execution of CM in the FAA. Consider mandating selected standards to meet FAA's CM information management needs;
- Develop and publish a CM Information Resources Catalog;
- Finalize CM automated tool requirements and conduct a pilot effort;
- Develop an "as-is" CM information architecture;
- Conduct gap analysis;
- Develop an enhanced (next phase) CM information architecture; and
- Develop an implementation plan to meet the enhanced architecture.

This report addresses CM information needs and sources.

1.2. Purpose

The primary objectives of this CM Information Needs Report are to:

- Identify major, cross-cutting, CM information needs throughout the FAA;
- Document current information sources and concerns regarding the accessibility, reliability, and timeliness of these sources;
- Identify the obstacles or inhibitors that prevent the FAA from achieving efficient and effective CM information management;
- Identify internal and external factors that impact CM information management; and
- Define those things FAA must do to meet CM information management needs.

1.3. Methodology

In developing the CM information needs and determining the recommendations/initiatives needed to meet these needs, the CMIM Working Group wanted to build upon past efforts. There have been several studies and analyses conducted by the FAA and its contractors to identify CM program weaknesses and improvement opportunities. Three reports, in particular, were reviewed:

- Faye Associates Report of 1994-95
- Configuration Management Improvement Team (CMIT) Conference of May 1995
- Configuration Management Business Process Reengineering of October 1995 to August 1996

These efforts identified a number of opportunities to improve CM; many of those findings still have promise today. All of these reports identified issues and opportunities related to the improvement of CM effectiveness in the FAA. CM information access and the potential for applying information technology is one of the consistent themes, but more detailed needs analysis was never performed.

The CM Core Team sponsored an off-site at TRW's Fair Lakes, VA facility in November 1997. As a first step in documenting the agency's CM information needs and sources, ASD-220 developed a survey to capture those CM documents that the CM community felt were needed by CM customers. This was a "quick and dirty" snapshot of requirements; information priorities were not established.

This report is the CMIM Working Group's first step in developing an agency-wide plan for improving CM information management – defining information needs and sources. In addition to drawing on the lessons learned by past study efforts, the CMIM Working Group pursued the following two initiatives:

- CMSG Information Sources Survey of May 1998
- Interviews with CM Stakeholders conducted between June and September 1998

Another product, the life-cycle CM process model currently under development by the CMSG-sponsored Process Working Group, was considered as a framework for this analysis. Since the model was not sufficiently mature to support CMIM requirements identification efforts, the

CMIM working group proceeded with this analysis with the intention of reviewing the life-cycle model (once completed) and augmenting this analysis as appropriate.

This report primarily documents the findings of two efforts, the information sources survey and the stakeholder interviews.

1.3.1. CMSG Information Sources Survey

This survey was intended to establish a baseline of information sources (both paper-based and automated) that CM process customers currently rely upon to execute their daily mission responsibilities. Past studies confirmed that information was fragmented throughout the agency. The CMIM Team wanted to document existing sources to:

- Facilitate customer access to existing information as the Working Group continued its work; and
- Provide a baseline for CM Information Architecture development and gap analysis. As information needs are identified, such needs and customers would then be mapped to available sources. Plans could then be developed to provide need access, as appropriate.

A summary of the systems reported is provided in Appendix D. Information from this survey will be published as a "CM Information Resources Catalog," providing a valuable tool for CM customers to locate needed information. This catalog will be made available on the FAA CM Intranet Page and will be updated periodically as we learn more.

1.3.2. On-Site Interviews

Interviews were held with FAA representatives across the agency to identify top priority stakeholder CM information needs and to determine how well those needs are currently being met.

The CMIM Working Group developed an "information thread" that represented the many life-cycle activities that generate CM-related information: from the requirements determination process through program development, systems design and development, systems deployment and systems operation (see figure 1). The team then selected three programs, Airport Surveillance Radar (ASR)-9, Terminal Doppler Weather Radar (TDWR) and Voice Switching and Control System (VSCS) as prototypes to evaluate documentation, information systems and drawing reviews. The criteria we used in selecting these programs included the number of systems in the NAS (expected sizeable CM-related activity), proximity to regional offices (so we could visit the sites) and the familiarity of the interview team with these systems.

The CMIM Working Group developed sample questions to serve as a guide, but the interview team kept the questioning flexible during the actual interviews. Interview objectives were to:

- Identify customer needs;
- Determine if the needs were being satisfied and assess how well they were being met;
- Identify the information sources they rely upon and assess source reliability; and

- Obtain suggestions to improve CM information management.

Interviews were conducted at the following locations:

- FAA Headquarters
- Central Region
  - Regional Headquarters
  - Kansas City ARTCC
  - St. Louis Sector Management Office (SMO)
  - St. Louis TDWR Site
- Mike Monroney Aeronautical Center
  - Logistics Center
  - AOS Second Level Engineering Offices and Facilities
  - FAA Academy
- William J. Hughes Technical Center
  - Technical Center Management
  - AOS Second Level Engineering Offices
- Southern Region
  - Regional Headquarters
  - Atlanta ARTCC
  - Atlanta SMO
  - Atlanta ATCT
  - Atlanta TRACON
  - National Network Control Center (NNCC)
  - Atlanta TDWR Site

At two sites, Central Region and the Mike Monroney Aeronautical Center, our CMIM Working Group member on-site coordinated and participated in interviews. A message was also distributed prior to each visit to introduce the project's objectives. Entrance briefings provided further background and amplification of project and interview objectives.

The CMIM interview teams conducted interviews with individuals and groups. Team members sought to better understand each customer's business, determine how CM impacted their business and assess CM information source responsiveness in meeting customer business requirements. When a customer identified a specific need (e.g., product team leads expressed the need for modification installation status), the team later observed and assessed how well that need was being addressed (e.g., how AOS and site technicians documented and communicated the completion of such modifications in the field). Selected records were reviewed and automated information systems data entry was observed, where appropriate. Everyone was very open and supportive. The CMIM Interview Team received many constructive suggestions. This was not an audit, but a sampling of CM related information activities.

CM "INFORMATION THREAD"

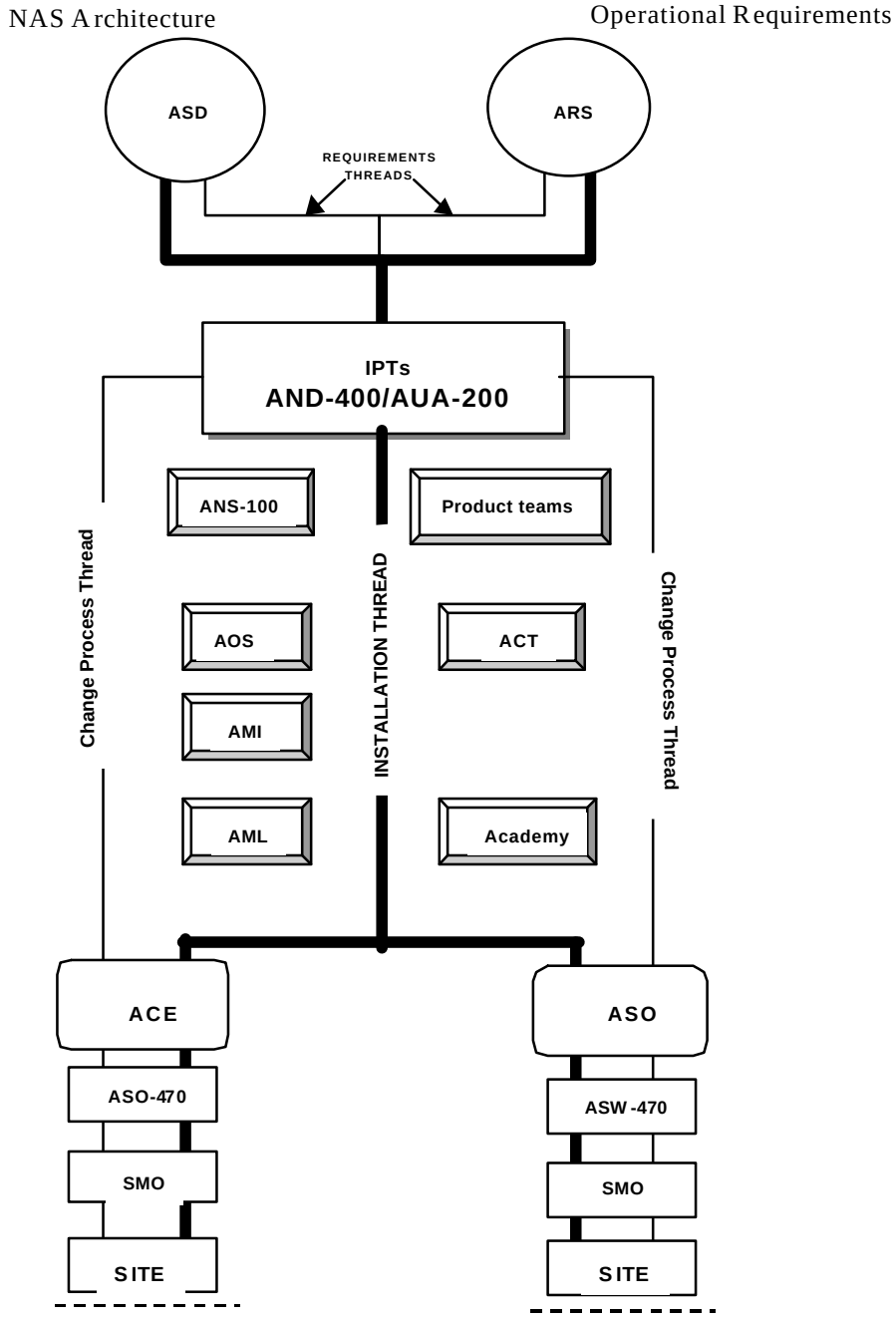

Figure 1

2. CM INFORMATION NEEDS

This section provides consolidated findings from the three past studies and CMSG-sponsored initiatives identified in the methodology section of this report. A summary of past study findings, with regard to CMIM, is provided in Appendix B. The majority of this section focuses on findings from the November 1997 CM Fair Lakes Off-site survey, the CMSG information sources survey and the on-site interviews. These initiatives were specifically designed to address, in greater detail, CM information needs and issues relating to the provision of such needs. The reader should find many consistencies between this report and past studies.

Our interviews identified many issues regarding the integrity, reliability and effectiveness of CM policies, processes and procedures. In fact, approximately 70 percent of what we heard could fall in the categories of policy and process, much of which had information management implications. Several issues continued to surface over and over again. We have documented these major issues for two reasons. First, we wanted to share the information with other CMSG-sponsored working groups so they could use this insight to improve the FAA's CM policy, guidance, training, education and processes. Secondly, and more directly related to the CMIM effort, we wanted to begin to understand the root causes for information inaccessibility, unreliability and timeliness. Only then could we develop reasonable improvement strategies and plans. One cannot improve information quality without addressing the fundamental policies, standards and processes that create and maintain it.

This section identifies the major cross-cutting information requirements, related issues and the needs to satisfy these requirements. For each requirement, this section provides:

- A brief statement of each major requirement;
- CM information needs expressed by interviewees;
- Some discussion that amplifies on the requirement statement and related issues;
- Interview findings; and
- Initiatives that should be considered to improve CM and related information management.

2.1 *REQUIREMENT:* The ability to identify and communicate the existing operational configuration of NAS hardware, down to the LRU level, and NAS software systems.

2.1.1. Information Needs

A. Feedback from vendors when they execute modifications.
B. One coordinated approach for change authorization documentation.
C. Language in the change authorization that describes why the change is necessary.
D. More standardized timelines for change installation.
E. Better information in change authorizations to help technicians certify systems.
F. Communication of benefits derived from a good CM program to agency personnel.
G. Communication of CCD closure.

H. Notification when mods have been released (when does the EEM or other change authorization get out?)
I. Software patch history.
J. Communication that the regional technician, AOS or vendor has in fact installed the mods.
K. Documentation and tracking of usable site spares inventories.

2.1.2. Discussion

The FAA is currently unable to effectively document, maintain *and communicate* its NAS operational baseline to all who need the information. We do not know, corporately, the current version/revision level of all hardware and software installed in the NAS.

From our brief sampling, it appears that modifications are, in fact, documented in Facility Reference Data Files (FRDFs) or logbooks at each equipment site. But the accomplishment of such changes is rarely if ever communicated beyond the sites. To accurately determine the current revision level of a system, one must usually call each individual site. For unmanned sites, technicians often must drive to the each site to check the FRDF.

From an acquisition perspective, equipment hardware and software modification status is at the top of the list of information needs. The ASR-9 spent $8 million for "go-back" teams to verify the revision levels of operational hardware and software and to bring such systems up to the currently approved revision level. In one case, they found that 11 modifications had not been installed.

From an operational perspective, mod status is needed to evaluate and debug system outages and to plan and design future modifications. Systems outages have occurred when technicians attempt to install modifications in systems that have not incorporated all previously approved modifications. These modifications are designed to work in systems that have incorporated all previously approved modifications. Since SMOs have up to six months to install non-safety critical modifications plus they are reluctant to install mods on systems that have incurred no system problems, accurate and reliable status accounting is even more important.

Finally, the Logistics Center needs timely operational configuration information to effectively and efficiently execute provisioning activities to ensure that the right spare parts for the installed configuration will be in stock when needed.

2.1.3. General Findings

This requirement spanned a broad area and we documented many findings. They are organized in the following groupings:

- Information source issues
- Installation/modification planning and implementation issues (i.e., the approval, authorization and implementation of changes to the NAS)
- Modification tracking issues
- Process, policy and education issues

Information Source Issues

There are several "islands" of information (both paper and electronic media) throughout the agency that can provide subsets of this information. It is often unavailable to others, inconsistent and tailored to meet program or localized needs. Specifically,

A. Information distributed by the mail appears to be lost, misdirected or delayed in some cases. This leads to less than optimal decisions at all levels and activities in the life cycle management of the NAS (engineering, technical support, logistical support, etc.). Official distribution lists do not appear to facilitate the information to those who need it in a timely manner.
B. There are many inconsistencies in information generated in change proposals and change authorizations.
C. The DOCCON maintains an MCI that identifies the major components of a system (although not the currently installed version of these items). Since not all IPTs and Regions support DOCCON, MCI reliability remains suspect.
D. Airway Facilities maintains the Facility Master File (FMF), a possible source of information for installed NAS systems. It does not appear to maintain the level of detail (i.e. version and revision level) needed, however.
E. The VSCS program is using a bar-coding system to track LRU's. This Harris-developed and maintained system provides information at the part level that helps plan spares procurements and to analyze failure trends. The CMIM Interview Team observed system use at two locations; one was very supportive the other was not. On the positive side, it provided detailed parts tracking for provisioning and failure analysis. On the negative side, it took too much time to use and its benefit was unclear to system users (apparently no localized benefit). Another apparent drawback to the system is that it cannot, at this time, roll up the parts information to a system level configuration.
F. The ARSR-4 program has developed a status accounting/modification tracking system using Lotus Notes. This client-server based system has a user friendly graphical user interface (GUI) front end that helps the users create and maintain the status of ARSR-4 configuration evolution nationally. It is effective, easy to use and well resourced. Their effort demonstrates, at least on a small scale, that client server technology can be used in a distributed environment to support agency-wide status accounting when such tracking is a priority (i.e., resources devoted to the function). Of course, a national effort for all NAS systems would be much more complicated. However, efforts such as the National Data Warehouse (NDW) developed by AFZ demonstrate that it can be achieved with extensive data management plans and programs.
G. New England Region is also piloting a system known as Bar Code Asset Tracking System (BCATS). We did not visit New England or assess the pilot implementation of the system to date. In reviewing the draft mission need statement, the VSCS system and BCATS appear to have similar functionality. We understand that BCATS has been interfacing with the Logistics Information System (LIS) as a demo to assess the potential for improved project material management.
H. The NIMS Program, as part of its Phase 2 deployment, is scheduled to begin addressing the capture of configuration information (i.e., versions of software and hardware resident in the NAS) in the year 2002. The benefit, of course, will be the ability to monitor configuration changes without separate tracking activities. Unfortunately, NIMS will only address a portion

of new systems coming on-line in the NAS (at least in the foreseeable future). It will not monitor all new systems or legacy systems, from a configuration management standpoint.

Installation/Modification Planning and Implementation Issues

I. Costly "go-back" teams and on-site reviews have become a standard component of system engineering and design activities in the FAA; historically unreliable operational configuration information is a major factor.

J. Modification approval, authorization, implementation and tracking are inter-dependent processes that are not well integrated, particularly from an information management perspective. CM requires information from each process, but no standards, naming conventions or other data relationships have been established to ensure that needed information can be shared across these processes.

K. AOS is responsible for developing change authorizations. According to AOS, they reference such authorizations back to the respective CCD. Historically this has been an issue.

L. Change authorizations often do not sufficiently describe modification purpose and functionality (from a technician's perspective) to allow technicians to feel comfortable to certify systems installed by vendors.

M. There is no standard way to issue modifications. Change authorizations include Electronic Equipment Modifications (EEMs), Emergency Telex Changes (TWXs), Site Program Bulletins (SPBs), and Site Technical Directives (STDs). Regional offices and System Management Offices (SMOs) would prefer one document; AOS-530 is piloting a single umbrella vehicle. This complex information environment increases the risk of inaccurate and unreliable information, particularly since each document is tracked and managed differently (e.g. AOS-200 and AOS-530 have established different methods and procedures).

N. Technicians do not know when EEMs were published, sometimes relying on informal notification from other technicians. As an example, the most recent EEM for an ASR-9 modification was received 4 months after it was published. AOS also distributes change authorization documentation differently. Atlantic City uses a combination of CD-ROMs and paper; Oklahoma City has been using paper, but plans to have all their EEMs, TIs and other documentation on their Intranet page. AOS-530 does prepare a quarterly report to track the status of modifications developed under their purview. It is a paper-based report that is distributed thorough the mail.

O. Modifications that are embedded in a notice are often difficult to track. The TDWR approach to modification issuance is a good example of a consistent methodology.

P. SMOs are often reluctant to install modifications for fear that such modifications will bring down the system. It is commonly understood, informally, that it is usually not in your best interest to be the first site to implement a mod. There is a "catch 22" here. Modifications are designed by the second level organization based on the current approved revision level. Because we do not have good CM in place, many of the sites differ from the expected revision level for a number of reasons (i.e.. they have not implemented all the previous mods, they have made some local adaptations, etc.)

Q. COTS modifications are not pre-tested like AOS-developed modifications.

Modification Tracking Issues

R. The Regions/Centers/SMOs have not tracked modification implementation consistently for the last three to four years (when AF required such tracking in Regional performance objectives). Modifications were tracked using local DOS-based tracking systems. One region still has the system as an "optional" resource; the other is establishing and ACCESS-based system.
S. The Maintenance Management System (MMS) has a equipment modification sub-system, but it is not consistently supported by all regions. It is not user friendly and the screens are not sufficiently descriptive to ensure consistent, accurate information.
T. AOP has launched an effort to re-initiate the use of the MMS mod tracking capability until the NIMS comes on-line and can assume that functionality. Given the feedback we received and lessons learned from past mod tracking endeavors, simply requiring MMS use without supporting guidelines to ensure consistent information capture will be only marginally successful, at best. Vendor controlled mods are not properly documented.
U. Management of changes to facility critical power, emergency generators, telecommunications, and uninterruptable power supplies are areas lacking standardization and a common approach

Process, Policy and Education Issues

V. The agency does a good job in managing baseline documentation, particularly in the early stages of system design, development and installation.
W. NAS changes are being implemented without appropriate CCB approval (e.g., UPS installations at TDWR sites). The stated reason: the formal NCP process takes too long and is non-responsive to operational urgency and needs.
X. The current SMO priority is the avoidance of system outages, which often contradicts with the objective of implementing mods. Reasons cited for delays in mod implementation include downsizing of technician corps, reduced funding, and a reluctance to bring systems down to install the modifications. Air Traffic will not release such systems until late at night when costly overtime would be required. Agency policies/priorities should be revisited.
Y. Customers must deal with many forms of change authorization documentation, including EEMs, System Trouble Reports (STRs)/Program Trouble Reports (PTRs), SPBs, STBs, PEMs, TWXs, etc. In some cases, some documents (i.e., HTRs, PTRs and TWXs) are taking the place of EEMs for expediency sake. This practice is becoming the norm.
Z. Systems engineering, systems architecture, systems design decisions are based on inadequate information.
AA. There is no process to document patches and changes directly to proms.
BB. The loss of Deployment Readiness reviews and the infrequency of TECHEVALS contribute to increasing unreliability of operational configuration information.
CC. Provisioning activities are hampered, leading to inefficient procurement of spares.

2.1.4 Information management improvement needs

A. A closed-loop NAS change management process. Information generated throughout the process must be linked across related, but currently uncoordinated processes (i.e., requirements, specifications, change proposals, change decisions, change authorizations and change implementation processes).

B. An FAA information architecture to identify information sources, identify and resolve gaps, and leverage information across organizations and existing databases across the agency.
C. A short, medium and long-term process improvement strategy to ensure a comprehensive, integrated modification tracking system (process, procedures and infrastructure support). A system to capture, maintain and communicate the evolving configuration of NAS hardware and software systems and sub-systems (versions and revisions) down to the LRU level (as defined by the requirements of each system). This system should include guidelines, processes, procedures, data naming conventions and standards, new/revised automated tools, databases, etc. Any approach must limit technician and other stakeholder intervention (i.e. limited keystrokes). NIMS, bar-coding systems, etc. are capabilities that should be factored into this approach.
D. Senior management support for establishing and maintaining configuration data and documentation for the NAS. The process for documenting and communicating such modifications should be further studied, new procedures developed and related information systems enhanced or replaced.
E. Clear definition of configuration identification to ensure data consistency. Examples include Lowest Replaceable Unit (LRU), Modifications, PROMs, etc.
F. Policy that addresses the management of modifications (i.e. firmware modification changes and issues, audit process to verify that mods have been installed, training process to educate technicians and others on the value of mod tracking)
G. CM requirements, responsibilities and authority included in FAA Order 1100.127, SMO Management..
H. Updated interim guidance and clarification to ensure accurate data collection in and reporting in existing mainframe systems such as MMS, LIS and DOCCON. Specific areas should include nomenclatures, naming conventions and other data element definitions.
I. Greater standardization and consistency in modification issuance.
J. Clear roles, responsibilities and accountability for configuration changes, documentation, reporting and tracking. Ensure that guidance addresses all possible scenarios regarding the organizations/individuals who may install such modifications.
K. Clear guidance on when change authorizations (i.e. EEMs) are directed and required.
L. Policy and guidance for contracts regarding modification completion reporting.
M. National policy on firmware modification and changes.
N. Audit process to validate that modifications have been installed and properly documented.

2.2. REQUIREMENT: A process that provides all information necessary to efficiently and effectively manage change proposals to the NAS.

2.2.1. Information needs

A. Wider, more timely dissemination of change approvals and implementing directions, such as CCDs, EEMs, etc.
B. Enterprise-wide must evaluator lists and prescreening comments.
C. Full time access to NCP/casefile text, graphics, evaluator comments and resolution.
D. Metrics and quantification of NCP process activities.
E. The nature and definition of CCB Authority (including the boundaries between NAS CCB, ANF CCB, IPT CCB and RCCB).

F. The boundaries and responsibilities for NCP review and processing. Stakeholders need to know the leaders and followers for change processing.
G. NCP text throughout the review process to avoid duplicative comments and actions (should be more real-time versus serial). There have been cases where duplicative NCPs have been developed because DOCCON descriptions were not descriptive enough to know that a similar or same NCP had already been started through the corporate review process.
H. NCP workflow process steps defined, documented and disseminated to process stakeholders.
I. Comments on casefiles made available to all stakeholders throughout the process.
J. Status of NCPs, Casefiles and CCD's as they are developed.
K. Budget information included in NCPs.
L. Life cycle cost information for NCPs including the impacts of training, spares, facility, power, technical manuals and safety.

2.2.2. Discussion

The NCP process is the primary mechanism used within the FAA to manage changes to the technical documentation that describes the NAS, its components, and systems. It is used for achieving agreement on programmatic issues, financial baselines, employee suggestions, and detailed engineering issues. Mostly, however, it is viewed as an ineffective and unresponsive process with little consideration of user priorities.

Interviewees from headquarters, regional offices, and SMOs consistently reported that it routinely takes up to two years to get an NCP approved. Status tracking during this period is poor and there are too many people involved in the process. The "Time-Critical" NCP classification and use is widely abused by those hoping to decrease the review time. Some NCPs may be stopped from must evaluator review by prescreening organizations, without appeal or redress. The process is not implemented consistently due to the growing and divergent role of IPTs. Many NCPs are viewed as only conceptual in nature, without adequate engineering detail or analysis to truly make a good life cycle or business decision. And, once implementation decisions are made, they are not widely disseminated and almost never validated at sites.

There are clearly software products on the market today that have the ability to meet the requirements of a diverse user group over an enterprise wide implementation, encompassing document management, document vaulting, workflow, CAD integration, and Configuration Management. Preliminary studies of both ANS and ASD have shown that commercial tools will satisfy requirements and that the requirements are common. In conjunction with contract efforts of ANS to evaluate automated tools for the Engineering Document Management (EDM) program, ASD-220 will be utilizing the selected EDM tool to pilot automation of Configuration Management. The workflow module of an automated tool will be ideal for creating a dynamic paperless NCP process utilizing the work of the CM process group.

2.2.3. General Findings

A. The NCP process does not provide adequate tools for management of the NAS.
   - Extensive backlogs of NCPs and CCDs exist.
   - Identification and tracking of NCPs and their status is ineffective.

- There is no ability to systematically analyze NAS change metrics (e.g., frequency of changes to each system, failure analyses, etc.).
- Needed information for life-cycle management decisions is not supplied.
- There are wasted resources caused by redundant NCP processing and inefficiencies.

B. Users have lost confidence in the NCP process.
C. Some changes are being made outside the NCP process (i.e., HTRs and PTRs). Debate continues whether such activities are appropriate without an NCP.
D. NCPs do not provide a means to control site configurations.

2.2.4. Information management improvement needs

A. Improved linkage between documents, decisions, and direction (e.g., between NAS Requirements, MCI, NCPs, CCD's, change authorizations, modification tracking, etc.).
B. An integrated agency-wide infrastructure (process, business rules, automated tools, communications, documentation repositories) to facilitate NCP development, review, tracking and approval.
C. Better guidelines for writing NCPs. The NCP form should be redesigned to better address relevant stakeholder needs and responsibilities.
D. Clearer guidance on must evaluator selection.
E. Expedited must evaluator and prescreening approaches, such as the AUA-200 FARM team initiative, assigning lead regions for select equipment, or inter-regional reviews.
F. Process accountability, checks and balances, and better promulgation of the change management process.

2.3. REQUIREMENT: More timely access to CM-specific documentation, supporting documentation and CM basic information to execute CM and program management responsibilities.

2.3.1. Information Needs

A. NAS Architecture, including SR-1000 documentation.
B. CCB documentation (Charters, agendas, action items, decisions, etc.)
C. List of the IPTs. This list should be linked to the IPDS Home Page.
D. CM points of contact list.
E. IPT must evaluator lists.
F. Electronic FRDF's to facilitate data access within and across regions.
G. Listing of CM information systems and sources.

2.3.2. Discussion

The IPTs are confident that vendor-generated baseline documentation typically meets the mark. After the government accepts the systems, however, the accuracy of configuration data and documentation begin to erode. The most critical document management issue is the fact that the FAA receives documentation in a variety of formats, complicating our ability to efficiently share information across the agency.

Accentuating this problem is the fact that most CM and supporting documentation is distributed in hardcopy. The more recent use of electronic media for some submissions has not been a panacea: even when the FAA procures new NAS hardware and software, interoperable standard electronic formats have not been consistently required for the system's supporting baseline and other documentation. In one case, an IPT today receives CM products from three different vendors in three different formats, as each vendor uses a different and incompatible CM automated tool. Offices are also distributing information on CD-ROMS using several viewers (e.g., Worldview, Adobe Acrobat and others). This adds greater complexity to field personnel. Training is needed to help facilitate technician transition to this new electronic environment.

The infrastructure and processes needed to make data available outside the originating organization is lacking. In some cases (e.g., AOS eliminating SMOs from their distribution), critical information for decision-making has to trickle through layers of the organization to reach its destination. A process needs to be established to make document and status accounting information such as lists of must evaluators, points of contact, and drawings available within each region more widely available to facilitate CM activities.

As an example, the Document Control Center (DCC) is responsible for maintaining the corporate library of CM documentation for status accounting purposes. Historically, programs provided the latest versions of documents to the DCC so that ASD-200 could then update DOCCON for status accounting purposes. More recently, IPTs have not consistently furnished updated documentation to the DCC in a timely manner. As the responsibility for updating DOCCON continues to be transitioned to the IPTs, the future role of the DCC needs to be clarified as part of an overall document management plan.

With the growth of the FAA Intranet and other corporate network resources, access to information is improving, but not all participants now have on-line network access at their workplace. Our interviews surfaced some disjointed but nonetheless encouraging initial work in this area. For example:

- AOS-200 will soon have all of its Technical Instructions, Maintenance Manuals and Change Authorization documentation on line through the FAA Intranet.
- AOS-530 is providing their documentation through CD-ROMS .
- IPTs such as En Route (AUA-200) are making their system-specific information available through IPT Web sites.
- The NAS Communications IPT (AND-300) has set up a cc:Mail bulletin board to distribute their CCB and related information.
- The TDWR program publishes a newsletter on their Internet Web site to keep the technicians up to date.

The responsibility of CM to provide status accounting of all this data provides a unique opportunity to better orchestrate this growing mass of information. Guidelines, procedures and standards are needed to manage this growth in electronic documentation repositories.

2.3.3. General Findings

A. Most CM documentation is still paper-based, making accessibility dependent on slow and unreliable distribution systems such as interoffice and postal mail. Many technicians still require hardcopy for several reasons, notably the need to review data at remote equipment sites.
B. CM information is not easily accessible outside the originating organization, and it is not maintained in interoperable, standard formats.
C. FAA Intranet use is expanding, but without corporate guidelines, standards and coordination. New "islands" of CM information are making it increasingly difficult for information consumers to locate and retrieve needed information.
D. Life-cycle system decision making is hampered. In some cases poor decisions are made on limited or unreliable information.
E. Each equipment site has extensive documentation, but it is inaccessible beyond the physical location of the equipment (e.g., FRDFs).
F. There is a reluctance to use electronic media for some business processes and deliverables due to difficulties in formal signature approval and authorization.
G. Information technology capabilities still lag behind current needs, particularly in the field. This has hampered agency-wide efforts to disseminate CM information. Thousands of laptops are being distributed to the field for technicians. However, some of those computers never make it to the sites. Corporate telecommunications infrastructure and information systems interfaces are not keeping pace.

2.3.4. Information Management Improvement Needs

A. An agency-wide CM document management strategy to guide the creation, maintenance and dissemination of CM and CM-related information. The strategy must define clear roles and responsibilities for corporate (e.g. DCC), IPT, AOS, Regional and other organizations; identify "corporate" information assets that are needed consistently across organizations; and the infrastructure to be used to make such information available to customers.
B. Improved, timely access to required documentation and other information. Appendixes C and F contain a list of the specific information needs identified by the CM community and on-site interviewees.
C. The FAA must promulgate agency-wide CM and related data and document interchange format standards to facilitate electronic information sharing. Interfaces to and data stored in existing and future CM-related information repositories must be made interoperable.
D. Acquisition policies and guidelines that specify life-cycle information needs for vendor deliverables.

2.4. REQUIREMENT: **Easily accessible and accurate drawings of commissioned sites and equipment.**

2.4.1. Information Needs

A. Access to "as-built" drawings, or at least a list of them.
B. Timely "as-built" drawing updates to facilitate engineering and design decision making. Drawings should be provided to the operations personnel.

C. Better integration of RCCB-managed drawings and system-specific drawings (i.e., integration or composite drawings).
D. On-line access to drawings (down to the site level) for review and update. Appropriate levels of access and security need to be established.

2.4.2. Discussion

The FAA utilizes a system of drawing control, which largely separates the change approval authority (the CCB), from the element maintaining the document. In most cases, equipment drawings/documents and standard facility drawings/documents are acquired and remain under the configuration control of the cognizant IPT. The master media (i.e., CAD files, MYLAR, word processing files, etc.) are almost never maintained by IPTs. Instead, the vendor creating the drawing/documents usually maintains them until they are accepted in final form and transferred to the FAA for subsequent maintenance.

The subsequent maintenance of master media within the FAA for equipment drawings/documents is usually split between AOS and the FAA Depot Component level drawings/documents and those acquired for re-provisioning purposes are delivered to and subsequently maintained by the FAA Depot. Until recently, most of these were simple aperture card deliveries. Other drawings, to include software documents and lists, are directed to the AOS support element charged with second level engineering support. Some of these drawings/documents, (like schematics), are included in technical manuals or maintenance procedures.

The master media for site drawings/documents are usually created and subsequently maintained by the regions. They often utilize the "as-builts" which were created from the standard facility drawing package. The standard facility drawing package may or may not be baselined by the IPT, but because it is only a nominal representation of a site, it is not usually updated or revised by the IPT. However, for those facilities/sites baselined by the Regional Configuration Control Boards (RCCBs), drawings showing site plans, floor plans, critical power panels, etc. are updated following the approval of an NCP by the RCCB members. The regions maintain a significant number of drawings (20,000 – 60,000), although it is estimated that only ½ of one percent are under regional CM control.

2.4.3. General Findings

A. Equipment drawings/documents are loosely managed between AOS and the FAALC. No division of effort, shared or defined responsibility for maintenance of the items was found.
B. Planned improvements for automated drawing/document retrieval systems at the FAALC do not currently include provisions for data sharing with AOS.
C. Most site drawings are not under configuration control.
D. The resident set of "as-built" drawings in the Regional Office differ from those maintained locally at the sites. Redlines are usually maintained at sites.
E. Changes are made to sites that are not documented in drawings (e.g., AOS and vendor-installed changes).
F. There is a backlog of regional drawings awaiting revision, sometimes lasting up to six months. This is partially because new F&E drawings are of higher priority.

G. FAA-STD-002D is used for drawing number assignment inconsistently and vendors are providing drawings with differing numbering schemas.
H. Naming conventions are not consistent within a region and across regions partly because consistent drawing standards are not used.
I. Engineers often create new drawings to avoid using the time-consuming NCP process to access drawings under configuration management and/or to avoid dealing with drawing errors.
J. Drawings are referenced back to job orders. This information may be useful in future resource analysis activities.
K. Drawings are not accessible on-line to all users.
L. New drawing sets are not consistent with CAEG managed drawings procedures.
M. Vendors and others do not start with "as-built" drawings when considering changes to sites. Site visits are conducted and new drawing sets are developed.
N. Drawing dependencies are not being captured in CAEG databases. Thus, when one level of site drawing is modified, other dependent drawings may have been overlooked.
O. The perception is that site surveys are "always" needed.

2.4.4. Information Management Improvement Needs

A. Establishment and enforcement of drawing standards. This includes numbering schemas, form and format for vendor provided system drawings, etc.
B. Clarified roles and responsibilities for drawing CM in the regions (what role should they play and what drawings should be under localized CM beyond current authorization). Clarification on systems integration at the site level is also needed. Do we need composite site drawings? Can they be developed and maintained?
C. Roles, responsibilities and authority that specify if and when electronic access is provided.
D. Drawings that are recorded and shared with all relevant customers.

2.5 REQUIREMENT: **An accurate and responsive FAA life-cycle corporate status accounting system.**

2.5.1. Information Needs

A. Clear responsibility for who should update DOCCON, particularly when system changes are made.
B. Where data is available in DOCCON, such data must be made quickly available in up-to-date report formats through the FAA Intranet.
C. NCP and documentation status.
D. Documentation version information.

2.5.2. Discussion

The FAA does not consistently use its corporate CM status accounting system. The FAA has a number of fragmented systems that are not coordinated or orchestrated (see Appendix D for a list of systems identified through the CMSG Systems Survey.)

DOCCON, the national CM status accounting system, is viewed as weak and difficult to use. The system also does not provide all needed status accounting information to agency stakeholders. For example, DOCCON provides very limited NCP information, and does not provide on-line access to the NCP at all. The Maintenance Management System (MMS), although not truly a status accounting system, is nevertheless a nationally based system that could augment DOCCON through its capability to provide critical modification status information. Technicians, however, find MMS frustrating to use and data entry screens do not provide enough information to ensure consistent capture of needed information. Due largely to this difficulty some regions do not require its use for tracking modifications.

Given such faults, individual program offices, Regions, and SMOs have developed tracking databases tailored to meet localized needs. This systems proliferation of systems/databases has resulted in meeting localized information needs at the expense of corporate needs (i.e. many of these groups no longer support DOCCON). At issue is whether CM data is a program asset or a corporate asset. In reality some is corporate (i.e. data that is needed across organizations for decision making) while other information is location-specific. Tracking of status accounting data continues to grow more fragmented as programs develop stove-piped tracking systems without integrating such efforts with corporate information repositories.

2.5.3. General Findings

A. The FAA does not have consistently reliable corporate status accounting information. Although DOCCON is available nationally, and is specified in FAA Order 1800.8F as the standard status accounting system for the agency, many CM stakeholders do not enter data into the system due to their frustration with DOCCON or its inability to support status accounting needs. DOCCON consequently becomes an unreliable source of status accounting data. Nevertheless, there is a recognized need for a standard system to capture corporate data. As one organization noted, “You cannot have all the IPTs doing CM in their own (i.e. different) way.”
B. There is a continued proliferation of fragmented systems and data due to frustration with DOCCON and other standardized systems and due to the wide availability of desk-top technology. Multiple program and organizational status accounting databases track status and version of documentation have sprouted up across the agency. In some instances, entire systems have been developed to compensate for the perceived weakness of DOCCON. For example, ANS-300 routes all CM related documentation to their own database; they convert much of this information to electronic format. These efforts take away from the accuracy of the corporate DOCCON system because the owners focus on their own localized systems. There is no central or integrated database that brings this data all together for corporate and cross-organizational use. Status data is viewed as a “program” or “office” asset rather than a “corporate” asset.
C. Because of fragmented information storage mechanisms, the FAA cannot accurately collect basic CM metrics, such as NCP processing time.

2.5.4. Information Management Improvement Needs

A. Demonstration that status accounting data should be made visible beyond organizational or program boundaries. That is, the FAA should require IPTs to recognize the need for and

value of corporate data, and must prove the value of current systems to store such data until current systems can be replaced.

B. Policy that DOCCON remain the single status accounting information system until a replacement can be designed, developed, and implemented.
C. An information architecture that documents all status accounting systems in the agency. Such an architecture will provide agency-wide awareness of and insight into locally maintained systems that are being used to overcome the weaknesses of DOCCON.
D. A nationally accepted and available system that provides CM stakeholders with all data required to perform status accounting activities on corporately maintained data. Such a system must overcome the non-intuitive nature of DOCCON, offer rapid response time during data entry sessions, and capture data identified by all organizations that use it. The system should also provide immediate access to substantially more data than is available through current mainframe systems, e.g., on-line documentation and NCP forms.
E. A strategy to provide interfaces between locally maintained systems, where such interfaces are both needed and acceptable to the managers of the systems in question.
F. Definitions for "corporate" CM status accounting elements (including standards and naming conventions) that process stakeholders must supply to the national system.
G. DOCCON education and follow-up training/support for IPTs and others as needed.

2.6. *REQUIREMENT:* Traceability from the NAS level requirements to actual configuration items

2.6.1. Information Needs

A. Traceability of system and sub-system information throughout the life cycle in agency life cycle documentation (i.e. requirements, specifications, NCPs, Interface Control Documents (ICDs), CCD's, change authorization documents, and modification tracking systems.
B. Traceability of configuration evolution not only to the system specification, but other requirements documentation (i.e. CONOPS, the NAS Architecture and other documentation).

2.6.2. Discussion

From a requirements perspective, both ASD and ARS agree that there needs to be greater traceability of requirements to NAS level specifications to other system-related documentation. This traceability would enable the FAA to determine the impact of such change proposals throughout the NAS system, and would substantially improve program planning efforts. One of the primary tasks of ARX-1, for example, is to examine the effect of NCPs on Mission Needs Statements to ensure that change proposals are within the originally stated need. IPT leads stated in on-site interviews that they would like to know the requirements of other IPTs so they can gauge the effect on their programs. The FAA should seek to facilitate the ability to trace the relationships between requirements stated in the various documents generated between system concept and implementation.

This integrated approach has been desired for quite some time. For example, ARS is in the process of developing a hierarchy of requirements documentation, from initial to final, and are creating a requirements waterfall model through system specification. Both ARS and ASD have chosen the automated tool known as DOORS to manage their requirements documentation.

However, the evolution of the Architecture, and the variety of CM support systems such as on-line documentation repositories and hardcopy libraries has generally made requirements traceability difficult and has at times obscured the relationships between systems documentation.

2.6.3. General Findings

A. The FAA is unable to efficiently assess the effect of proposed changes to systems on original operational requirements. Some organizations simply use the phone to determine what NCPs affect baseline documentation. There is a need to integrate the NCP with requirements and requirements documentation to make sure they state the same need. The integration of changes with original documentation should help develop a history of requirements.
B. The ability to track requirements from document to document aids in the collection of metrics that drive program planning. For example, the ability to count the number of NCPs that affect specific architecture requirements can help determine how the architecture should change.
C. Program planning is costly and time consuming. Three years are now needed for program planning, in part because it is difficult to trace requirements through program documentation.
D. The FAA is unable to effectively validate that documented requirements are, in fact, being satisfied thoroughly. The FAA has difficulty using contractor documentation, for example, and consequently cannot determine the effect of contractor work on original functional requirements.
E. The requirements tracking process is evolving both at the NAS and operational levels.

2.6.4. Information Management Improvement Needs

A. An information model that documents the linkages and data entity relationships to these various activities.
B. Business rules that define the relationships.
C. Information links from requirements documentation, to NCPs, ICDs change authorizations and modification tracking.
D. Clear, integrated roles and responsibilities across the various impacted disciplines and processes (requirements development, systems design and production, second level engineering, CM, and field operations) to ensure that needed links are established and maintained.
E. Commitment from all participants on the process to support the approach. If pieces of the process do not participate, the whole process will fall apart.

2.7 REQUIREMENT: **Other information to ensure efficient and effective CM operations.**

2.7.1. Information Needs

A. Identification of those Configuration Items and drawings that should be managed under CM in the Regions.
B. Statistical data on CM processes to evaluate process effectiveness (e.g., processing time for an NCP, how many have been implemented, etc.) and to develop program metrics.
C. Cost accounting information (how much are we spending on CM related activities?

D. Quantification of CM benefits to the FAA.
E. Compatibility of FAA data and products from vendor tools, processes and systems to ensure CM effectiveness once we inherit their work.

2.7.2. Discussion

This section addresses other information needs that do not directly relate to any one of the previously described information requirements. These needs generally fall under the caption of "overall CM process integrity."

2.7.3. General Findings

A. Corporate CM Information management standards do not exist.
B. The FAA CM Authority is not in a position to assess agency CM program effectiveness.
C. The FAA information technology infrastructure is still evolving. Although computer assets have been improved overall, not all CM stakeholders have access to DOCCON, the Intranet, CD-ROM readers and other equipment necessary to access CM information.
D. Roles and responsibilities remain unclear in a number of areas. Lack of clarity contributes to inaccurate, unreliable information.

2.7.4. Information management improvement needs

A. Updated and consistent FAA CM standards for operation (operational procedures) and standards for the management of information (i.e. electronic format for documents and drawings, drawing interchange standards). Standards should be imposed on FAA contracts to facilitate the management and sharing of information.
B. Minimum set of Contract Deliverable Requirements Lists (CDRLs) and Data Item Descriptions (DIDs) for CM purposes, including Engineering Change Proposals (ECPs), Specification Change Notices (SCNs), Notices of Revision (NORs), Functional Configuration Audits (FCAs) and Physical Configuration Audit (PCAs) Plans and Reports, status accounting CDRLs and DIDs, drawing packages, technical data packages and nameplates.
C. Standards are for web pages. Although much more information is becoming available, location of needed information and more web pages grows more complicated. Moreover, web pages are being designed to meet localized organizational needs. Improved corporate coordination/orchestration is needed.

3. CMIM OBSTACLES AND INHIBITORS

Prior to establishing priorities and developing implementation plans, there are several obstacles or inhibitors that have historically contributed to information accessibility, reliability and timeliness issues. The following factors must be considered and addressed in any future action plans if the agency is truly committed to improving the effectiveness and value of CM to NAS management.

Senior Management Support. Senior management must agree that CM information management is a corporate priority. This will require collaboration across organizations, organizations must be willing to change (e.g., view information as a "corporate" rather than "program" asset) and accountability must be established and enforced. This priority must be effectively communicated to all levels of FAA NAS management.

Resources. With recent downsizing and operational funding reductions, CM information management will continue to compete for scarce NAS staff and funding resources. The information needs identified in this report must be prioritized so that alternative strategies can be developed to satisfy the highest priority needs. CM information should be viewed as a resource and investment, rather than a cost.

Institutionalizing the New CM process. Without a reliable, predictable and repeatable process (including business rules), data and information quality will continue to suffer. Workflow automation and other automation initiatives cannot succeed.

FAA's technology infrastructure. The Intranet is a valuable resource for those who have access to it. Access issues go beyond cost, including internal policy issues – who should have Internet/Intranet access in the agency? The reality is that even though we do not have Intranet access everywhere in the agency, it continues to grow.

Moving to a Commercial off-the Shelf (COTS) environment. The FAA's ability to require certain data and information standards (with regard to CM documentation from vendors and contractors) is being limited by acquisition reform. This will complicate our ability to share such information, internally, once systems are fielded.

Policy implementation and enforcement. When agency professionals do not chose to support corporate information systems because they are not user friendly or do not meet their immediate needs, we cannot hope to maintain reliable corporate information if the maintenance of such databases is at the discretion of each level of the organization. Admittedly our mainframe systems need improvement; that is not the reason to cease and desist!

4. NEXT STEPS

Improvement opportunities include not only the application of technology, but improved policy, processes, procedures and training. Standards or the lack thereof, is clearly a major weakness. As we move forward, we must keep this broader CM environment in mind because there are interdependencies and interrelationships among them. For example, as we consider the application of automated tools to facilitate NCP workflow in the mid-term, such tools provide the added capability to document NCP status accounting.

There are many opportunities highlighted in this report. In the short term, making documentation more accessible to those who need it is very achievable. Fostering partnerships between CM stakeholders across ARA and ATS will be key in achieving successful strategies for creating, maintaining and providing access to needed CM information. Defining the roles and responsibilities and establishing accountability must be a priority. The CM authority, in concert with the CMSG and others, must establish priorities in these many areas.

A sampling/audit process will also be necessary to periodically assure accountability. With a formal CMIM Information Architecture in place, CM POCs will become extended core members of the CMIM team. Future revisions to the CM Information Architecture can be developed utilizing input from the CM community and the CMSG.

Now that we have more specifically identified customer needs, the CMIM Working Group recommends the following as next steps:

Integrate this work with other effort. The CMIM team should share this information with the CM Process, Policy and Resources Working Groups, integrating the work of all working groups, establishing priorities, and developing an implementation plan to improve the execution of CM activities.

Move forward with other CMIM initiatives to improve information accessibility, reliability and timeliness. The CMIM team should:

- Provide greater access to existing information through the FAA CM Intranet Home Page, tailored reports in DOCCON and others as appropriate. Focus first on that information highlighted in the interviews and broaden the scope as time and resources permit;
- Complete an “as-is” CM information architecture;
- Conduct gap analysis (i.e., balance stated needs and issues against the current “as-is” information environment and the agency CM enterprise model (life cycle process model));
- Develop strategies to resolve information gaps;
- Share this information with the CMSG and gain feedback (i.e. Priority of efforts);
- Develop top-level implementation plans for the top selected strategies;
- Obtain CMSG concurrence on the plan (including the dedication of resources);
- Implement approved plans; and
- As time and resources permit, pursue lower level strategies.

APPENDIX A

CMIM WORK GROUP MEMBERS AND ON-SITE INTERVIEWEES

CMIM WORK GROUP MEMBERS:

Bob Bostiga (ASD-220), Co-Team Lead	*
Guy Hawkes (AOS-100), Co-Team Lead	
Darrell Wyrick (ASD-220)	*
Bill Eggleston (ASD-100, NISC)	*
Paula McCann (AML)	*
Vera Shinn (ACE-470)	*
Bob Payne (ASD-SETA)	*
Lou Pelish (AIT-500/AUA-600)	
Brian Alberts (ASD-SETA)	
Mark Levy (ANI)	
George Zerdian (AND-100)	

* = Members of the interview team. Combinations of this group made up individual on-site review teams.

INTERVIEW SUPPORT

The following individuals helped coordinate CMIM on-site reviews and/or participated in the interviews:

Ray Weimer, AND-400
Tracy Chamberlain, Gateway SMO
Tena Woods, AOS-200
Pat Conner, AOS-530
Cecil West, ASO-471/NISC
Yolanda Walker, ASO-471/NISC
Mike Klebba, ASD220/SETA

INTERVIEWEES

CENTRAL REGION				
Name	Organization		Name	Organization
Alers, Orlando	STL-AOM		McPheron, Dan	GTW SMO
Barenberg, Bill	ZKC-NCO-NISC		Piper, Robert	ACE-470
Barr, David	STL Radar SSC		Price, Kirk	ACE-470
Besel, Jim	ACE-470		Ramig, Gordon	GTW SMO TSU RDR
Bing, Jack	AOS-610		Riffel, Lee	ACE-450
Chamberlain, Tracy	GTW SMO TSU		Ruf, Jim	GTW SMO
Crain, Lee	ZKC-NET		Scott, Pat	ACE-470
Gregg, Marsha	ACE-452C		Segar, Chuck	ANI-500
Harrison, Mike	ACE-470		Shinn, Vera	ACE-473
Janecek, Larry	ACE-450		Sortor, Don	ACE-450
Kitson, Jim	ACE-470		Thomas, Gary	GPSMO-TSU
Lueckert, Scott	ACE-450		Van Shoten, Chuck	STL NAV COM SSC
Markussen, Merritt	ZKC-CRM		White, Jeff	ACE-450
McMurry, Andy	ACE-471		Williams, John	ACE-470
McNerney, Barbara	ANI-500			
MIKE MONRONEY CENTER				
Name	Organization		Name	Organization
Adkins, Pam	AML-632		MacKenzie, Mike	AMA-410
Behmens, Dennis	AML-10		MacWatters, Nancy	AOS-510
Butz, Dick	AOS-250		Magruder, John	AML-460
Cooley, Donna	AML-632		Marxen, Michael	AMA-430
Cooley, Heather	AOS-200		McCall, Ken	AML-460
Cudjo, Witty	AML-631		McCann, Paula	AML-110
Delisle, Jack	AML-110		Michaud, Mark	AOS-230
Evans, James	AML-448		Miller, John	AOS-200
Fergus-O'Brien, Adele	AML-632 AIM		Moffatt, Dana	AMC-4
Gaynor, Judy	AML-110		Sanchez, Bruce	AOS-224
Howeth, Alan	AOS-250		Sanzone, Jim	AOS-510
Howeth, Alan	AOS-253		Spencer, Jerry	AML-110
James, Bill	AML-110		Sydnor, W.H.	AML-631
Jerome, Darren	AML-632		Watkins, Eddie	AOS-204
Jesler, John	AML/AND/ FTS		Weimer, Mary	AOS-224
Jorski, Dave	AOS-200 MACA		Woods, Tena	AOS-200

SOUTHERN REGION				
Name	Organization		Name	Organization
Adornato, Larry			Lopez, Ed	
Anderson, David			Madsen, Mel	
Anderson, Donnie	ZTL ESU		Mason, Don	ATL SMO TSS
Bhatia, Manoj			McCleab, Jerry	AOS-600
Boggs, Matthew			Murphy, Brian	
Burch, Dennis			Parsell, John	
Carnicom, Mike	ATL SSC		Pharr, Jim	
Curtis, Lewis			Raines, Marilyn	ATL SMO-TSS
Davis, Vaughn			Rives, Wayne R.	ATL SSC
Dudley, Darrell			Roberts, Chuck	ZTL NCO
Farmer, Neil	ZTL COMM		Rollins, Paul B.	ZTL SSC
Ford, Janet			Sloat, Mike	
Granier, Jeff			Stanley, Tom	
Griner, Tom	ZTL ARTCC SSC		Taylor, John	
Halley, Mark	ATL NNCC		Thrash-Alexander, Sharon	
Hightower, Roger			Walker, Yolanda	ASO-471
Holmes, Jerry E.	ATL SSC		Washington, David	
Hookings, Mark	ATL SMO-TSS		Watts, Conchita	
Jachron, Gary	ATL NNCC		West, Cecil	ASO-471
Johnson, Bob	ATL SMO		Williams, Arden	
Knowles, Rick			Williams, Rich	
Leese, Carmel			Wilson, Jim	
Livingston, Tom	AMCC			

WILLIAM J. HUGHES TECHICAL CENTER				
Name	Organization		Name	Organization
Chalender, Bob	ACT-410 AS&T		Hopkins, Doris	ACT-410 AS&T
Conner, Pat	AOS-530		McCoy, Delmerah	ACT-410
Davenport, Lori	AOS-310		Preston, Joseph	ACT-410 AS&T
Diaz, Kenneth, J.	ACT-410 AS&T		Smith, Rose H.	AOS-530
Durso, Tony	AOS-530		Trench, Patrick	ACT-410 AS&T
Happel, Frank	AOS-500			

FAA HEADQUARTERS				
Name	Organization		Name	Organization
Wein, Robert	ASD-200		Lombard, Don	ANS-100
King, Rebecca	ASD-220		Steele, John	ANS-100/NISC
Link, Jim	AND-400		Thomas, Russ	ANS-100/NISC
Weimer, Ray	AND-400		Ludwig, Hal	AND-100
Lanham, Brooke	AND-400		Bell, Hal	AND-100
	AND-400		Shea, John	AND-100
	AND-400		Staples, John	ARS
Walthers, Sadie	AUA-200		Leyman, Phil	ARS
Phoff, Bob	AUA-200		Heinen, Jim	ANI-2 (A)
Harrison, Mike	ASD-100		Ford, Rick	AFZ
Horrocks, John	ASD-100		Solas, Felepe	ANS
Rupp, Jay	AOP-		Middlestedt, Ed	ANS-300
Fessler, John	Fesler Technical Services			
Eggleston, Bill	AOS-100 NISC			
Klebba, Mike	ASD-220 SETA			
Weimer, Ray	AND-407			
Wyrick, Darrell	ASD-220			

SUMMARY OF PAST STUDIES

The following paragraphs provide a summary of the information management related findings, issues and recommendations. This appendix provides a foundation for the recent work done by the CMSG sponsored CMIM working group and it also serves as a ready reference for CM information management planners as they develop future implementation plans.

Faye Associates Study

ASD tasked Faye and Associates Inc., under a sub-contract to META, to assist in the evaluation of CM. The FAA reorganization put in place during the fall and winter 1994-95 prompted this assignment. The survey team conducted 22 interviews in the Washington area, including all the employees who performed CM duties in Engineering Specialties, then ASD-140 (the headquarters organization responsible for the FAA CM function. In addition, the support contractor, BTG, other staff offices in ASD-100 responsible for supporting product configuration in the IPTs, a QRO, and company radar systems personnel at Westinghouse, a manufacturer of FAA equipment. Visits were also conducted in the Southern Region, FAA Technical Center and Aeronautical Center. The final report's major findings related to CMIM included the following:

- *One pervasive complaint about the NCP process involves system-processing time. It is a universal opinion that the system takes too long and the primary cause is the time required for review of NCPs and the resolution of reviewer comments.*

- *The system (DOCCON) is regarded as not user friendly and inaccessible. Data access routines and searches are complicated and tedious and discourage casual users. Managers or project personnel do not use the system. The user interface must be improved with new screens and operator processes so that personnel can easily access the wealth of information resident in the DOCCON files. A quick fix should be taken in this area now without waiting for profitable longer term changes in the data and records that an enhanced system might eventually contain as part of other initiatives to enhance the configuration management data base.*

- *The Director, Office of System Architecture and program Evaluation, ASD-1 has recently asked for a feasibility study of an entirely new management information system including a revised CM component. In brief the new system is envisioned as one in which mission, requirements, programs, equipment and other factors are all linked through a computerized traceability system……. The new, user friendly computerized system would speed the physical handling of most case files and NCPs with little or no paper flowing and in 10 to 20 days instead of 4 months with appropriate management enforcement of review times. The objective is to develop a system which is faster, easier to use, and which meets not only the needs of those who do the detailed CM work but those of planners and managers as well.*

CM Business Process Re-Engineering (BPR)

A yearlong BPR effort was conducted to define future (End State) CM process and procedures for the FAA. The BPR was conducted with the assumption that all things are possible and that there are no constraints. The output of this process is a project set completed in September 1996. The CM Vision, as described in the final BPR Report, had three major components, one of which was particularly relevant to this effort:

Information technology will be used
to capture and communicate CM data and
to manage the CM process.

The BPR "Full Team," consisting of CM professionals from across the agency, conducted several exercises to validate and rank the primary customer need statements. Of the top 10 needs, 5 were information related (in the order selected):

1. Complete and Integrated Information Source
3. Timely Processing
4. Current Information
6. On-Line Access to Information
9. Data Available for Decision Making

One of the two key concepts in the CM BPR vision was an "Information, communication and collaborative infrastructure." The BPR position was that accurate engineering and CM-related information must be provided in a timely manner to enable the CM vision. The information conduit, referred to as the "Information Communication and Collaborative Infrastructure (ICCI)," was to be based on an Internet or Intranet model, providing access to distributed CM-related information. Program specifications and other documentation would be available FAA-wide in a NAS virtual library accessible through the ICCI. In addition to facilitating the distribution of information access across the agency, the technology concept supports a common change control interface, collaborative decision making, virtual meetings and decision boards, metrics collection and analysis, and a CM professional forum for sharing industry best practices and CM lessons learned. The BPR emphasized technology infrastructure, a key component of the CM information architecture. This study attempts to move towards other aspects of the information architecture (information management, information architecture, etc.).

Configuration Management Improvement Team (CMIT) Study

ASD-1 tasked ASD-100 to improve CM in the FAA. Surveys were conducted and documented with recommendations for improving CM. A team of users representing the FAA offices responsible for CM met May 16-18, 1995. They discussed issues affecting the CM process and offered their recommendations for improvements to that process. A package of background information was put together and sent out for participants to read before the conference. This information included the Faye Associates Report; a list of obvious problems ASD-140 drew up, the Configuration Management Survey Plan, and a list of other recommended reading.

The CMIT found that relevant CM data was not being reported or shared, leading to incomplete and/or inconsistent databases. Both reports also highlighted numerous process issues that had a direct relationship to the accuracy and reliability of information. These included inconsistent Configuration Item (CI) levels, acceptance and processing of incomplete casefiles and NCPs and NCPs being used inappropriately. The most apparent issue was the lack of management controls at all levels. The information management related recommendations and other items specifically shared in our interviews included:

PROBLEMS:

- Presently we don't track individual serial numbers.
- Databases contain information but no one knows about them
- Inability to track at the facility level.
- EEM infrequently references the CCD.
- Too much data, not enough information.
- Logistics and CM control not married.
- Management of inventory of field.
- Don't know when a CCD is closed.
- No guidelines for closing a CCD.
- Too many evaluators.
- Too much time trying to resolve comments that don't belong to them.
- Lack of continuity in NCP processing.

RECOMMENDATIONS:

- Hold managers responsible/accountable for enforcing guidelines.
- Improve DOCCON access and training
- Assess costs associated with a change
- Expedite the evaluation process
- Centralize databases (CCD actions)
- Limit NCP processing where possible
- Reduce the number of must evaluators
- Centralize (restructure?) the status accounting (logistics and CM) database
- Consolidate or provide interfaces between the databases (hierarchical?)
- Need feedback for modifications
- Need a data management organization to look at what is out there now and where it is headed
- Study implementing bar-code technology

FAIR LAKES OFF-SITE SURVEY FINDINGS: DOCUMENTATION REQUIREMENTS AND AUTOMATED TOOLS

The Fair Lakes Survey provided a wealth of information regarding CM documentation Requirements and automated tools in use at that time. This appendix summarizes the results of that survey.

CM Documentation Requirements

CM Plan	***Product baseline documentation (continued)***
IPT CM Procedures and operational guidelines	• version description documents
Contract documentation (Statement of Work, CDRL, Procurement requests)	• software users manuals
Configuration status accounting records	• provisioning technical documentation
Interface Requirements Documents (IRD's)	• subsystem training documentation
Interface Control Documents (ICD's)	• COTS documentation
NAS Change Proposals (NCP's)	• supply support documentation
Engineering Change Proposals (ECPs)	NAS Configuration Control Decision (CCD)
Master Configuration Item Index (hard copy)	CCD's for Local and test modifications
Case Files	Hardware Discrepancy Report (HDR)
• NAS level	Program Technical Report (PTR)
• IPT level	NAS Documentation and Configuration Identification Data Sheet
• regional level	NAS Requirements Baseline
Case file transmittal	NAS Functional Baseline
NAS Functional Design specification (NAS-DD-1000)	NAS Allocated Baseline
NAS System requirements specification (NAS-SR-1000)	Subsystem Requirements Baseline
Hardware System/Segment Specification	Subsystem Allocated Baseline
Software System/Segment Specification	Subsystem Design Baseline
NAS Allocated Design	Subsystem product baseline
"As-built" Configuration Items (CIs)	Configuration Management (contractor requirements)
Configuration Audit Report	Documentation and Configuration Index (DCI)
Product baseline documentation	Waivers/Deviation requests
• product specs (C)	Computer Program Functional Specifications
• ICD's	Specification Change Notice (SCN)
• operators manuals	Electronic Equipment Modification (EEM) Handbook
• support tool documentation	Site Program Bulletin (SPB)
• technical instruction books	Site technical Bulletin
• as-built engineering drawings	F&E Program Descriptions
• product specifications	Special Maintenance Project Description
• special acceptance tools	Change Notices to Maintenance Technical Handbooks

Tools In Use Overview

Tools Used to Manage Software *(Version Control, CSA, Doc. Status, Problem Tracking)*

- By FAA (AOS-200/530, AUA-600)
  - INFO
  - MIS
  - NPR
  - LIS
  - CC Harvest
  - PVCS
- By FAA Vendors (Supporting AUA 300/600)
  - Clearcase
  - CCS

Tools Used to Manage Hardware *(Version Control, NCP Tracking, Doc. Status, Inventory)*

- By FAA (AOS-530, AUA-600)
  - MS Access
  - MIS
  - NPR
  - LIS

Tools Used to Manage Documentation *(Version Control, CSA, Doc. Status, Requirements Tracking)*

- By FAA (ACT-200, AUA-200/300/600, AOS-200/530, ANI-400)
  - DOCCON
  - MIS
  - DOORS
  - LIS
  - NPR
  - DMS
  - CAEG
  - MS Access
  - Worldview
  - Intranet
  - CC Harvest
- By FAA Vendors (Supporting AUA 300 and AOS-200)
  - DOORS
  - MS Access
  - Worldview

Tools Used to Manage Requirements *(Requirements Tracking)*

- By FAA Vendors (Supporting AUA 300/600)
  - DOORS
  - RMS

Tools Used to Manage Casefiles/NCPs *(NCP Tracking, Inventory)*

- By FAA (AUA-600, AGL-471)
  - MS Access

- Electronic NCP Form
- MS Excel

Tools Used to Manage PTRs *(NCP Tracking, Inventory)*

- By FAA (AUA-600)
  - MS Access

Tools Used to Manage Drawings *(Version Control, Drawing Revision)*

- By FAA (ANI-400, ASW-472)
  - CAEG
  - DMS
- By FAA Vendors (Supporting ASW-472)
  - CAEG

Full Summary of Tools In Use (By Function)

Acq., Ops, Field, Vendor	Version Control	Config. Status	NCP Tracking	Status Accntg.	Doc. Status	Drawing Revision	Req. Tracking	Inventory	Problem Tracking
Software Mgmt.									
INFO		AOS-530							AOS-530, AUA-600
MIS	AOS-530	AOS-530			AOS-530				
NPR	AOS-530	AOS-530			AOS-530				
LIS	AOS-530	AOS-530			AOS-530				
CC Harvest	AOS-200	AOS-200							
PVCS	AOS-200	AOS-200							
Clearcase	AUA-300 Vendor								
CCS	AUA-600 Vendor								
Hardware Mgmt.									
MS Access			AUA-600					AUA-600	
MIS	AOS-530	AOS-530			AOS-530				
NPR	AOS-530	AOS-530			AOS-530				
LIS	AOS-530	AOS-530			AOS-530				
EQUIP									
Documentation Mgmt.									
DOCCON				AUA-300, AUA-600					
MIS	AOS-530	AOS-530			AOS-530				
DOORS							AUA-300 Vendor		
LIS	AOS-530	AOS-530			AOS-530				
NPR	AOS-530	AOS-530			AOS-530				
DMS	ANI-400								
CAEG	ANI-400								
MS Access				AUA-200			AUA-300 Vendor		
Worldview	ACT-200, ACT-200 Vendor								
Intranet				AUA-200					

Acq., Ops, Field, Vendor	Version Control	Config. Status	NCP Tracking	Status Accntg.	Doc. Status	Drawing Revision	Req. Tracking	Inventory	Problem Tracking
CC Harvest	AOS-200	AOS-200							
Requirements Mgmt.									
DOORS							AUA-300 Vendor		
RMS							AUA-600 Vendor		
NCP/Casefile Mgmt.									
MS Access			AUA-600					AUA-600	
Electronic NCP Form			AUA-600						
MS Excel			AGL-471						
PTR Mgmt.									
MS Access			AUA-600					AUA-600	
Drawing Mgmt.									
CAEG	ANI-400, ASW-472					ASW-472 Vendor			
DMS	ANI-400								

CMSG-SPONSORED INFORMATION SOURCES SURVEY

Twenty-seven responses were received (including 11 pertaining to the Logistics Information System). Follow-up work is continuing on these and other known systems. Profiles of these sources will be used to develop the first FAA CM Information Resources Catalog. The Resources Catalog will provide a short-term aid to assist CM customers locate the information they need. It will also serve as a valuable tool as the FAA's CM Authority continues to work with the FAA community to better integrate existing resources and orchestrate future systems development efforts.

The following pages provide a summary sorted by system name.

CMSG-Sponsored CM Information Sources Survey Summary

System	POC	Interfaces With	Comments
Alaskan Regional Case File Inventory List	Nelson Gnirke AAL-472C 907-271-5364	DOCCON	The inventory lists Alaskan generated casefiles. Data included are casefile number; date received by reviewer; the IRR and prescreening orgs; regional CCB, and the associated NCP/CCD number. The file is maintained in both Word and WordPerfect, and dates from 1993. Data is not proprietary. The inventory does not exist on the Intranet.
Alaskan Regional IRR Must Evaluator List	Nelson Gnirke AAL-472C 907-271-5364	DOCCON	The inventory lists Alaskan generated casefiles in the IRR stage of review. Data included are casefile number; date received by reviewer; response due date; review organization and region; and associated NCP/CCD number. The inventory is maintained in Excel. Data is not proprietary. The inventory does not exist on the Intranet.

System	POC	Interfaces With	Comments
AF Workload Information System (AF WIS)	Barbara Froome AFZ-200 202-267-3203	FSEP (from FMF and PFF files of MMS)	The WIS system is comprised of three subsystems that keep track of commissioned and precommissioned facilities in the NAS; generate workloads for each piece of equipment at each location where the equipment is located; and break down by each type of task the hours needed to complete routine maintenance on equipment. These three subsystems together fill the requirements of order 1380.40C. 1) The FSEP subsystem displays data taken from the FSEP file of the MMS. Data displayed includes a description of each facility, the inventory by region of each piece of equipment, the facility code for equipment, status of equipment (e.g., commissioned, out-of-service, standby, etc.), decommission date, and other equipment related data. AFZ-200 has a hard copy of a list generated from this on-line tool called the "FEP Desk Guide." This document is updated once a year by the SW region. The guide is not on the Intranet. 2) The Staffing Standards Analysis System (SSAS) takes data from FSEP and generates workloads for each piece of equipment at each location where the equipment is installed. It shows the staffing needed to maintain equipment in the FMF for the next 5 fiscal years. It also shows the inventory of equipment at each region. 3) The Staffing Values File system breaks down for each region the number of hours needed for each task needed to maintain equipment (e.g., electrical work, environmental work, periodic maintenance, etc.). It lists the hourly allocation for each piece of equipment by the type of work required to maintain it. This subsystem can be used to generate trend analyses reports to determine where work is needed most frequently, and on which piece of equipment. The customer of the tool is largely AFZ-200. Access to data is restricted, and must be approved by AFZ-200. Reports from WIS are not placed on the Intranet. The tool is located on a PC and LAN at the NISC II site in Washington, DC. The tool is written in FoxPro.
ANS Casefile and NCP Tracking System	Wendy Pierce ANS-110 202-267-7371	None listed.	The New NCP Spreadsheet contains the overall Must Evaluation Record for each NCP/Case file, including the priority, case file #, NCP#, the date the NCP was received, the original due date, the divisions doing the prescreening, the status of their findings (concur, concur with comments or non-concur), the date it goes to be initialed by the NISC reviewer, and the date it goes to the FAA 110 team lead for signature. Once the NCP has completed the cycle, it is then moved to the Old NCP Spreadsheet for reference. The Case File Spreadsheet and the Old Case File Spreadsheet contain the same information, except for case files. The system is loaded on one machine only in ANS-110. The system tracks only those casefiles and NCPs related to ANS-110. Information is similar to that in DOCCON, but is tailored to the needs of ANS-110. The data is not proprietary, and will be released to any interested office. Data from the system is not available through the Intranet.

System	POC	Interfaces With	Comments
AOS-200 Process Asset Library	Ed Watkins AOS-200 405-954-0279	None listed.	Contains links to the following: a) CMM templates for each AOS project. b) AOS-200 Technical Documentation Library, which includes Maintenance Handbooks, Technical Instruction Books, EEMs, PEMs, Notices, SPBs, STBs, and miscellaneous reference documents. c) AOS-200 points of contact d) AOS-200 procedures and policies, which includes Division Operating Procedures, AOS-200 Process Asset Library, AOS-500 Process Asset Library, GEMINI Team Process Asset Library, and miscellaneous policies and procedures. Available through the FAA Intranet at http://aos-inet.jccbi.gov/AOS-200/toc.htm.
AOS-200 Technical Documentation Library	Tena Woods AOS-200 405-954-5122	None listed.	Contains maintenance manuals, mod notices, EEMs, and TIs for AOS projects. The system contains information about AOS (e.g., AOS divisions, points of contact, phone lists, description of organizational responsibilities, and strategic plans), links to NAS-SS-1000, NAS-DD-1000, NAS-SR-1000, NAS-MD-001, the CIP, and the MCI chart. The system also contains a variety of FAA personnel information, press releases, and Y2K data. The system is available through the Intranet at http://aos-inet.jccbi.gov/AOS-200/toc.htm. Documents are in PDF format.
ARSR-4 Configuration Tracking System	John Fesler AOS 405-954-9401	Accepts data from LIS, MCC, NAPERS, and site FRDFs and other site configuration data.	The ARSR-4 Configuration Tracking System provides site parts status and electronic access to system technical data. Information typically used at sites includes Tibias, Equipment Notices, Safety Notices, Maintenance Handbooks, Drawings, Training Material, On-site spare status, Site configuration information. Information generally used by field and support personnel includes site parts usage data, failure data to the LRU level, repair cycle data, asset allocation, equipment trend analysis, and LRU configurations.
Ccc/Harvest	Dave Jorski AOS-200 405-954-4426	None listed.	Ccc/Harvest is a COTS CM tool used by AOS-200 to manage the baseline of NAS Engineering Division (NASED) SW, FW, and documentation. It also tracks the changes made to NASED software, firmware, and documentation. Data is not proprietary, but does not exist on the Intranet.

System	POC	Interfaces With	Comments
Computer Aided Engineering Graphics (CAEG)	Coval Hale ANS-110 202-267-7177	Case file and CCD numbers from DOCCON and the DCC.	CAEG is the FAA's national technical graphics package. It provides an automated technical graphics information data base and a suite of 2-D and 3-D application software (Auto-Trol). Information contained on CAEG consists of national and site specific F&E drawings, digital terrain mapping, obstruction information, etc. The system contains drawings for new and existing programs, and information obtained from the Airport Trust Fund. The system also contains electronic data obtained from the National Flight Data Center and maps and grids of the U.S from the USGS and the Defense Mapping Agency. CAEG is also used to create and manage engineering drawing packages and documentation, radar signal interference models, and mapping capabilities. The system enables engineers to generate designs and site plans using data on airport layouts, flight tracks and noise contours, population densities, roads, highways, and obstructions. CAEG can superimpose mapped data items against terrain and manmade obstructions. CAEG is available through workstations resident in the Aeronautical Center, the Tech Center, Headquarters, ARTCCs, and Combined Enroute Radar Approach Facilities. CAEGs in each region are connected by the ADTN2000 network. A more complete description of the CAEG system can be found in Future FAA Telecommunications Plan ("Fuchsia Book"), AOP-400, April 1998, Section 50. The Fuchsia Book is also available from the DCC at 202-651-2392. Modernization of the CAEG is discussed in the Aviation System Capital Investment Plan, ASD-100, January 1997.
Corporate Information Management System / National Data Warehouse (CIMS / NDW)	Gregory Hicks AAF-60 202-267-7073	LIS, FMF, PPIMSK, DAFIS, TIMS, FIMS, IPPS, RTP, MMS dumps. MMS/FMF dumps monthly right now; daily from NIMS at least - based on customer requirements	CIMS/NDW stores information related to ATS's need for a standards-driven repository of strategic, historical, and programmatic information. NDW gathers information from legacy systems, and translates that data into meaningful aggregation at Regional and HQ level. It maintains data from 1992 to present, and currently holds organizational, facilities and equipment information: accounting and personnel information; payroll information; telecommunications information; LIS/FMF tables for LIS app-to codes linked to FMF codes; Cost Center resolutions between DAFIS and FMF; and facility obligations summary tables to break cost center costs to FAC level. Data is available to anyone requesting access.

System	POC	Interfaces With	Comments
Documentation and Configuration Identification System (DOCCON)	Darrell Wyrick ASD-220 202-358-5344	Facilities Master File for Facility acronyms	The three primary functions of DOCCON are to: a) store information about NAS CIs and documentation. CI information includes CI name, baseline status, OPI, and operational status. Documentation information includes document number, revision level, baseline status, OPI, and storage location. b) store information about change requests to the NAS, from inception through final disposition. Information includes CIs and documents linked to a change request, review status, reviewing organizations, due dates and actual dates for reviews, and actions resulting from CCD approval. c) provide an online method for ordering NAS technical documentation from the Documentation Control Center. DOCCON resides on the ICE-MAN mainframe, and is available throughout the agency. Access is available by calling ASD-220.
Documentation Control Center (DCC)	Darrell Wyrick ASD-220 202-358-5344	DOCCON to accept documentation orders, and to display status of these orders	The DCC is the library of technical NAS documentation. Documents can be ordered by using the ordering option of DOCCON, by calling 202-651-2392, or by using the instructions at http://interweb.faa.gov/cm_intra/index.htm.
DOORS	John Horrocks ASD-120 202-358-5321	Non listed.	DOORS is used by ARS to manage NAS level requirements.
En Route CM Database	Bob Pfoff AUA-240 202-366-5462	None listed.	The database stores all aspects of Change Control tracking for all En Route products (Case File prescreening, NCP Must Evaluation, CCD actions items, etc.), status accounting, and systems baseline. It is located on the AUA TAC LAN, shared drive. Beta versions are being tested on the AUATAC server which allows access to remote users for both Access 95 and 97 versions. The system an Access 95 database housed on the TRW/AUA TAC LAN. The database has built-in security for users, and allows "guests" Read-only access. Minimum requirements include Pentium with Windows 95 and 16 Megs RAM. The Terminal IPT has recently begun using it, and the database has initial built-in "hooks" to allow further expansion to more IPTs. The database serves as the prototype for the En Route CM Web page on the FAA Intranet.
Environmental and Safety Information System (ESIS)	Jeanne Brady Saum ANS-500 202-267-8593	ESIS copies facility data from MMS; energy contracts, vendors and charges from DAFIS; worker's compensation data from WCIS.	ESIS assists headquarters ANS-500 program managers and regional safety and environmental managers track data related to environmental, energy and safety compliance for NAS facilities. It stores remediation project data, funding and budget data related to those projects, energy contracts, energy vendors, lists of compliance problems at facilities, and worker's compensation data. The system consists of four modules: Energy Management Reporting System; Asbestos; Safety Environment Assessment System; and Fuel Storage Tank Management. The system is scheduled for full deployment on the HQ LAN by the end of 1998. Parts of the system may be available through the Intranet by the end of 1999.

System	POC	Interfaces With	Comments
FAA Intranet	Alan Hayes AIT-300 202-267-7357	Used as the FAA WAN to transmit CM data.	The Intranet serves as the private, secure FAA WAN.
Facility Master File (FMF)	John Salzbury AOP-100 703-925-3000	Supplies information to most Maintenance Management System (MMS) subsystems. Automated national outage reporting systems interface with FMF.	The FMF is a subsystem to the FSEP on MMS. Within the MMS, it is referred to as the Facility/Service primary information file (FFA). The FMF interfaces with outage reporting systems, and is used for scheduling technical inspections and performance evaluations. It is also used in support and control of property management, accounting, and auditing systems. The file contains technical information including Facility Type (describes the use of equipment in the NAS), Facility Identification Code (describes the composition of equipment by kind of electronics, model and/or manufacturer, antenna or substation type, and ancillary equipment), and Facility Class (further breakdown of Facility Identification Code, used to identify factors that affect work load). The file is used to: a) measure facility and service performance b) schedule technical inspections and performance evaluations c) support and control property management d) support the modification and directives distribution system (see Order 1720.30) by defining replacement and mod programs, determine costs of operation, and energy use. e) supply technical information such as facility types, facility identification codes, and facility class f) identify facilities by city, state, location identifier, cost center code, GSA address code, and region g) record changes to equipment. Sector managers are responsible for maintaining and updating the FMF. The FMF is completely described in Order 6000.5, revision C, available through the Documentation Control Center at 202-651-2392.

System	POC	Interfaces With	Comments
Facility Requirements Data File (FRDF)	Regional 420 branch Call regional 400 branch and ask for -420.		FRDF: This is a paper-based binder/file that is maintained for each "system" or piece of operational NAS "equipment" at each equipment site. Information contained in the FDRF include: * Joint Acceptance Inspection (JAI) Reports * Facility General Reference Data * Facility Technical Performance Data (spares and other information) * Initial Technical Performance Data * NCP's on the system * FAA Form 6032-1; AF Modification * Facility Technical Inspection reports * Facility Drawings (Listing - actual drawings are maintained separately, but nearby). * Manufacturers Test Data Documents * Other Documentation * Superceded Records
Facility, Service, and Equipment Profile (FSEP)	John Salzbury AOP-100 703-925-3000	Information in FSEP is used by other subsystems of MMS, e.g., periodic maintenance/certification scheduling subsystem and the logging activity subsystem to tie maintenance activities with NAS facilities and services.	The FSEP is a major subsystem of the MMS, Phase 1, which tracks and maintains a profile of all the facilities, services, and equipment in the NAS. FSEP provides the mechanism for maintaining a record of all NAS facilities, services, precommissioned facilities, power systems, and equipment to the circuit/board/card level. The subsystem is described in Order 6000.5, revision C, available through the Documentation Control Center at 202-651-2392. The FSEP incorporates or replaces the Facilities Master File, Precommissioned Facility File, and the Engine Generator Profile. The FSEP contains these files: a) Facility/Service primary information (FFA) b) Precommissioned facility information (FPF) c) Detailed facility equipment information for a particular facility type (FEQ) d) Detailed module information for specific equipment (FMO) e) Power system information for the engine generator profiles (FPS)
Great Lakes AFSS/ATCT History Spreadsheet	Will Helm AGL-471A 847-294-8487	None listed.	These Excel Spreadsheets list the complete history of changes to AFSS and ATCT facilities in the Great Lakes region. Data stored includes CCD, drawing number, and change description. The spreadsheet is maintained on a workstation in AGL-471A. Data is not available through the Intranet, but is available from AGL on request.
Great Lakes ATCT Modernization Spreadsheet	Will Helm AGL-471A 847-294-8487	None listed.	This Excel spreadsheet contains the local ATCT modernization schedule. The spreadsheet is maintained on a workstation in AGL-471A. Data is not available through the Intranet but is available from AGL on request.

System	POC	Interfaces With	Comments
Great Lakes Baseline Activity Spreadsheet	Will Helm AGL-471A 847-294-8487	None listed.	This Excel Spreadsheet lists the number of baselined and non-baselined NAS facilities by region, per the Standard Document for Facility Baselining developed by AGL-471 and the Strategic Planning Committee. Facilities include ARTCC, ATCT, AFSS, ARSR-4, Large TRACON, CERAP, NADIN, Independent TRACON. The spreadsheet provides cross tallies to list the total number and percentage of baselined and non-baselined facilities for all regions. The spreadsheet is maintained on a workstation in AGL-471A. Data is not available through the Intranet but is available from AGL on request.
Great Lakes Baseline Package Spreadsheet	Will Helm AGL-471A 847-294-8487	None listed.	This one page Excel spreadsheet shows the different types of drawings that must be included in a baseline package. The spreadsheet is maintained on a workstation in AGL-471A. Data is not available through the Intranet but is available from AGL on request.
Great Lakes Baseline Planning Spreadsheet	Will Helm AGL-471A 847-294-8487	None listed.	AGL uses this Excel Spreadsheet to plan baselining activities. The spreadsheet shows the schedule and list of tasks that are needed to successfully complete the baselining of each ATCT in Great Lakes. The spreadsheet is maintained on a workstation in AGL-471A. Data is not available through the Intranet but is available from AGL on request.
Great Lakes Expenditure Spreadsheet	Will Helm AGL-471A 847-294-8487	None listed.	This spreadsheet tracks expenditures of the different programs for which AGL is responsible.
Great Lakes Facility History Spreadsheet	Will Helm AGL-471A 847-294-8487	None listed.	This Excel Spreadsheet tracks the history of changes to each facility in the Great Lakes Region. For each facility, a separate spreadsheet lists case files, case file originator, date case file received and signed off, reviewing organization, date of RCCB, CCD number, date CCD issued, date CCD closed, CCD title. The spreadsheet is maintained on a workstation in AGL-471A. Data is not available through the Intranet but is available from AGL on request.
Great Lakes National NCP Review Spreadsheet	Will Helm AGL-471A 847-294-8487	None listed.	This Excel Spreadsheet tracks all national NCPs sent to Great Lakes for review from other regions, IPTs, or HQ. The spreadsheet lists the organization from which the NCP was received, the NCP number, the associated case file number, the date the NCP was received, the date the review is due, the date the NCP was actually returned to the originating organization, the organizations assigned to review the NCP, the manner in which the NCP was returned (cc:Mail, fax, etc.), and any comments. The spreadsheet is maintained on a workstation in AGL-471A. Data is not available through the Intranet but is available from AGL on request.
Great Lakes RCCB NCP Tracking Spreadsheet	Will Helm AGL-471A 847-294-8487	None listed.	This spreadsheet tracks equipment and space layout NCPs processed through the AGL RCCB. The spreadsheet is maintained on a workstation in AGL-471A. Data is not available through the Intranet but is available from AGL on request.
Library Tracking System (LTS)	Pat Conner AOS-530 609-485-6908	Planned interface with the MIS.	LTS captures documentation and project data released to the field, and facilitates the update and retrieval of AOS library hardcopy deliverables. LTS tracks projects (EEMs, SPBs, STBs, HBKs), documents (TI, NAS-MDs, etc), attachment and TDC book data for the AOS library. It captures check in/check out status, authors, various delivery and approval dates, and a variety of title, description and comment text. Data is not on the Intranet.

System	POC	Interfaces With	Comments
LIS-Automated Procurement System	Paula McCann AML-110 405-954-5016	None listed.	APS builds PRs from automated requisitioning data and MRP requirements; maintains historical record of items and money; maintains information on funding by committed, obligated, and canceled status. It maintains information by accounting string including project authorization numbers. It updates inventory records with due-in information.
LIS - Bill of Material	Paula McCann AML-110 405-954-5016	None listed.	Bill of Material will maintain the as designed baseline as well as each site baseline. It records demand history by site and will be able to relate demand trends to site configurations. It will be able to capture mean time between failure for LRUs by site and reference designation. Bill of Material will maintain an indentured parts list, including serial numbers down to the LRU indenture for fielded systems. Bill of Material will maintain capability to read across multiple bills to show LRU multiple equip. apps.
LIS-Cataloging	Paula McCann AML-110 405-954-5016	None listed.	Cataloging supports the central FAA data file for the automated entry, standardization, and maintenance of basic item identification data on material managed by the FAA. Cataloging maintains part number to stock keeping unit (NSN) relationships, maintains information on obsolete parts and part number rolls, and provides a platform to assure standardization among all government agencies.
LIS-Engineering Database (EDB)	Paula McCann AML-110 405-954-5016	Interfaces with LIS Cataloging subsystem. Plan to incorporate information from BCATS.	EDB correlates EEMs to the LRU (NSN), part numbers, drawing, drawing revisions, and automatic test equipment. EDB also maintains repair history beneath LRU at serial number indenture. The repair history record includes the revision level of the serial-numbered item. EDB has automated reports that compile failure and repair history at LRU indenture. EEM also maintains modification/revision level of serial-numbered items, revision level of correlated products (drawings, ATE), and correlation of LRU and products (drawings, ATE).
LIS-Equipment Population	Paula McCann AML-110 405-954-5016	None listed.	The system identifies location and quantity of systems in the field.
LIS-Field Spares Inventory (FSI)	Paula McCann AML-110 405-954-5016	None listed.	Field spares inventory (FSI) provides visibility of selected spare parts at various field locations. These spares meet the criteria for "critical" or "controlled" designations. It also provides the capability to update, excess, and transfer these items as needed. FIS maintains item balance for site, provides data for inventory, and can transfer spares to another site. FIS can loan spares to another site, excess spares, and can inquire spares records.
LIS-Inventory Management System (LIS Core)	Paula McCann AML-110 405-954-5016	None listed.	LIS provides support for field and FAALC inventory processes, including cost and performance reports. These core modules or subsystems provide the basic materiel management and control and inventory. LIS maintains complete transaction history of any NAS item ordered through LIS. This history can be used to identify facilities that have ordered mod kits. LIS keeps the demand (request) record and the issue record for each NSN, as well as the demand history by site and application. LIS maintains information on substitution/interchangeability relationships between NSNs. The system includes online requisitioning capability.

System	POC	Interfaces With	Comments
LIS-NW Mountain Prototype	Paula McCann AML-110 405-954-5016	None listed.	The prototype collects install and remove information for LRUs as part of the requisitioning process. It captures supply support code for the site requesting a replacement item, and equipment application and reference designator where the item was installed when it failed. It captures site maintenance reason, NSN, cage code, part number, serial number related to site, equipment application, and reference designator. It captures revision level of removed and installed items. The prototype is limited to NW mountain region, VSCS, ASDE3, and ASR9.
LIS-Production Control System	Paula McCann AML-110 405-954-5016	None listed.	PCS provides for the planning and scheduling of repair and fabrication actions in the FAALC. It tracks material and labor costs on all shop actions.
LIS-Project Materiel Shipping/Receiving (PMSRS)	Paula McCann AML-110 405-954-5016	None listed.	PMSRS provides an on-line automated process to create, coordinate, and print the Project Material Shipping Notice/Receiving report. A form is provided to contractors by FAA as authorization to ship material to a field location or the Aeronautical Center.
LIS-Project Materiel	Paula McCann AML-110 405-954-5016	None listed.	The Project Materiel Management System provides control of data for the agency's National program for installation and modification of air traffic control and air navigation facilities.
Level of Repair Analysis (LORA)	Rob Shields AML 405-954-5329	None listed.	The system produces analysis on broken equipment for one NAS system at a time. Results are used to build source maintenance and recovery codes for sparing efforts, and to determine if equipment can be repaired or should be discarded. The system is a stand alone system residing on a PC at the Aeronautical Center. It is written in Adelphi and C++. Data from the system is not proprietary, but is not available on the Intranet.
Logistics Support Plan	Will Sydor AML 405-954-8009	None listed.	The LSP is a document that lays out requirements for system support. There is one document for each system; program managers for systems should have a copy. The document discusses such things as maintenance plans for the system, supply support, and so on. The document changes as maintenance needs change. The document is available from program managers of each system. It is not proprietary. The document is not available on the Intranet.
Management Information System (MIS)	Pat Conner AOS-530 609-485-6908	Interfaces with the NPR subsystem of the MMS. Planned interface with the Library Tracking System (LTS).	MIS is a problem reporting system tracking PTRs, HDRs, and CCDs, and implementing Directives for AOS and ACT. The system is written in Oracle, and is available to sites as well as the Tech Center.

System	POC	Interfaces With	Comments
Modification Index Database (MID)	Chris Crowley AOS-200 / MACA 405-954-4327	None listed.	The MID is an Electronic Engineering Modification (EEM) index tool that indexes and allows downloading of AOS-200 generated EEMs. It allows for the addition, modification, deletion, search and printing of any index entry (not the EEM itself) currently a part of MID/EEM. MID also indicates mods and changes issued to mod handbooks. In addition, MID/EEM allows for the maintenance of the database files and their indices. The index and downloading feature is available at http://www.aos-inet.jccbi.gov/AOS-200/.
Maintenance Management System (MMS)	John Salzbury AOP-100 703-925-3088	None listed.	MMS provides management of maintenance activities through the collection, storage, and access to facility and maintenance data of sectors, work centers, regional offices, and other select organizations. Data contained includes facility maintenance log entries, PTRs, HDRs, NCPs, field stock updates, parts orders, schedule updates (e.g., periodic maintenance schedules), notification of parts received, FSEP updates, and maintenance related employee suggestions. The system also includes equipment failure entries, corrective maintenance entries, equipment interchange or replacement entries, and equipment modernization/modification/repair entries. The system also provides an automated parts and materiel control system for Depot and locally purchased spare parts. This control system contains location and balance information for selected parts. MMS contains the following subsystems (among others): a) Facility/Service/Equipment Profile (FSEP). Provides the mechanism for maintaining a record of all NAS facilities, services, precommissioned facilities, power systems, and equipment. b) Logging Activity. Provides the mechanism for recording and reviewing all maintenance activities including equipment installation and modification, corrective and periodic maintenance, facility/service certification, and interrupt reporting. c) Outage Reporting. Provides at the Executive Node the means to maintain a National Outage Data Base (NODB) of line performance and facility/service outage data. MMS generates NAPRS 6040-3 and 6040-7 reports and files containing daily and non-daily NAPRS outages. d) Periodic Maintenance/Certification Scheduling. Automatically schedules PM and normal certification tasks. Document TI 6030.1 rev F, "User's Manual for the MMS" discusses use of the MMS in detail.
National AirSpace Information System (NASI)	Robert Payne ASD SETA 202-651-2272	Available from the ASD CM Intranet page	NASI is an Internet based document repository. Documents available on NASI include the 1996 and 1997 CIP; 1996, 1997, and 1998 RE&D Plan the latest version of the Master Configuration Index (MCI); the latest version of the NAS-MD-001 report; the SS-1000, DD-1000, and SR-1000 documents; FAA IRDs; FAA Standards and Handbooks; Architecture products (up to version 2.5); and information about Flight 2000. The URL is http://www.nasi.hq.faa.gov.
National Problem Reporting System (NPRS)	Pat Conner AOS-530 609-485-6908	Interfaces with MIS. PTRs and HDRs are sent to MIS.	NPRS is used by the field to report Program Technical Reports (PTRs) and Hardware Discrepancy Reports (HDRs) to the maintenance organizations. These are problems that do not require a casefile. It maintains Problem description, system, date data, status, identification numbers, implementation directives, problem location, hardware type, and software versions.

System	POC	Interfaces With	Comments
NAS Infrastructure Management System (NIMS)	Mike Shevada Hal Ludwig AND-130 202-493-4344		NIMS will provide a distributed management infrastructure to implement AF future concepts of operations. NIMS will be used to implement a maintenance strategy based on detailed trend analysis, resource availability, and NAS traffic requirements. NIMS will contain data about operational NAS hardware and software as baselined by the NAS CCB, and the official development systems baselined by the various other CCBs. NIMS will undertake maintenance management to the LRU level. NIMS is in Phase I as of Sept. 1998, which focuses on resources management. NAS CM will be part of Phase II implementation after c. 2001.
Northwest Region Active Casefile Worklist	Georgia Van Pelt ANM-471 425-227-2519	None listed.	ACW stores information about casefiles generated by the NW region only. Data elements stored duplicate those in DOCCON, and include casefile number, location identification code, related Technical Employee Suggestion, date casefile received in RO, casefile title, remarks, review status, date casefile forwarded for PRS review, the PRS office, assigned NCP number and prefix, and CCB decision date. Data is stored from 1988. The system is a MS Access database, and exists on only one machine. Data is not proprietary, and will be released to any interested office. Data from the system is not available through the Intranet.
Olathe Center (ZKC) Power Panel Program	Vera Shinn ACE-473 816-426-3820	None listed.	The system provides current information on the power distribution schedules for the critical, essential, and building service panels at Olathe ARTCC. Data is proprietary, is not on the Internet or Intranet, and is maintained and distributed only through administrators of the system. Information on 229 breaker panels include panel designation, BUS, location, fed from, type, volts, amps, phase; also information on 6870 related breakers such as amps, poles, description.
Point of Contact List	Wendy Pierce ANS-110 202-267-7371	None listed.	Lists points-of-contact, organizations, phone numbers, and fax numbers for CM POCs for headquarters, IPTs, Aeronautical Center, Tech Center, and Regions. The list is also available at the FAA Intraweb CM web page at http://interweb.faa.gov/cm_intra/index.htm
Regional Libraries	See Comments, or call the regional office.		The following regions maintain libraries with regional specific data. Regions not listed below generally only keep region specific case files/NCPs informally, which can be obtained through the CM POC for the region. Eastern: EA has a small library with a complete set of FAA Orders, and newer SPBs, revision orders, and CCDs. Due to space limitation, EA RO often calls IPTs or specific engineers for information. New England: NE ANI has a small library with FAA Orders, revisions, TIs, and so on. The NE RO also has a reference room with drawings for systems specified by NE charter, including centers, AFSS, selected tower TRACONs, and ARSR-4. Southern: Library contains FAA Orders, all TIs, SPBs, STBs, NOR for the Orders, and some MD and CPFS books. A list of the library contents may soon be available on the Internet. Call Cynthia Little for more information at 404-305-6554.

System	POC	Interfaces With	Comments
Southern Regional NCP Tracking System	Cecil West or Mike Simpson ASO-471 404-305-6563 404-305-6569	DOCCON	The system provides the Southern Region CM Staff and customers with detailed status concerning every case file received in the Southern Region. By detailed status is meant a complete history of those actions taken to ensure timely processing and tracking of a case file from receipt to closure. The system is built in Clipper, but is currently being migrated to an Oracle platform. The new Oracle based system has undergone field testing and changes have been submitted. The system resides on the Southern Region AF Ops LAN; contact ASO-426 for access or data.
Telecommunications Information Management System (TIMS)	Dan Potes AOP-600 202-314-7765	None listed.	TIMS provides a common data repository for telecommunications ordering, billing, and inventory control functions, including an inventory of FAA leased and owned circuits. It provides an automated capability to conduct ordering, financial and circuit tracking, and graphical query functions for telecomm products and services. It includes information about owned and leased national and regional assets, and provides data warehousing and reference information for the entire telcomm life-cycle. Regional offices can use TIMS for service and product ordering, reconciliation of circuit data, financial tracking, inventory, and configuration reporting. HQ uses TIMS for circuit planning and ordering, configuration analysis, and cost/budget allocations. The system exists on UNIX and Oracle platforms. Data is not proprietary. The TIMS Web Site is http://tims-web.faa.gov (Intranet); and http://www.tims-web.faa.gov (Internet). The TIMS Hotline/Helpdesk number is 1-888-322-8467.
XStream	Robert Pfoff AUA-240 202-366-5462	None listed.	XStream is a COTS CM tool that provides baseline management of established baselines and development baselines. It provides workflow management, risk management, Status accounting, requirements management, change management. For En Route, XStream maintains Contracts/Subcontracts Quality Evaluation Records, Action Items, ECPs, Corrective Action System, Status Accounting, Deviations & Waivers, Originator information, Affected Items, Affected Contract, Affectivity information, Effects on system specs and baselines, Cost and savings information, proposed solutions and approvals, impacts to hardware and software, Change authorization and implementation information, Requirement number and unique prefix identifier, Derived requirement indicator, on-line review board dispositions, Build structures, Build package creation.

Systems not included:

ABS (Automated Budget System)
Reason: Aeronautical Center budget system
AOS-200 Data Management System
Reason: Contains project management, budget, travel and time data. No CM data
APM (Acquisition Process Model)
Reason: Acquisition related

ATOMS (Air Traffic Operational Management System)

Reason: Supplies real-time operational information on air traffic operations to manage the air traffic system. ATOMS Provides, operates, and supports the applications that track the number of air traffic operations and delays taking place Within the air traffic system nationwide. This data is used for planning, tracking, and evaluating air traffic system Performance. The system also collects data used for scheduling air traffic controller shifts, overtime, staffing, and Training. All this per the CIP. There seems to be no CM related data.

BCS (Budget Certification System)

Reason: Budgeting

CDMP (Corporate Data Management Program)

Reason: No CM data. Not a system, just a policy.

CMAS (Configuration Management Automated System)

Reason: Decommissioned.

Core Architecture

Reason: This program is not in the CIP.

Corporate Data Repository

Reason: The project is dead. Never populated with data. Developed under ODMS, which never went anywhere.

Corporate SW Engineering

Reason: This program is not in the CIP. Anyway, no CM data offered.

CSA (Corporate Systems Architecture)

Reason: From description in CIP, it doesn't seem to contain any CM data (e.g., in 1996, the program completed a Personnel locator, secure email, and published a data documentation standard)

DAFIS.

Reason: Accounting system.

Data Standardization

Reason: The project is dead. Developed under ODMS, which never went anywhere.

EDB (Engineering Database)

Reason: No CM data.

Facilities Management Analysis Tool

Reason: Hasn't been updated since 1996.

Facility Security Reporting System (Formerly FIRS)

Reason: Entirely security information. It contains facility security info (where the facility is, its security requirements, its inspection schedule, The nearest airport, whether it's co-located with another facility), information on inspectors (who they are), and incident reports. Info is Proprietary, and is controlled by ACO-400. It is PC based (FoxPro 2.6), and although it is being re-written for the Intranet no data is Currently moved from the FoxPro system to the Intranet.

Facility Subsystem Requirements Database

Reason: Hasn't been updated for 1.5 years

Facility System Analysis Tool (FSAT)

Reason: decommissioned

FACTS (FAA Acquisition Consolidated Tracking System).

Reason: Acquisition

FAST.

Reason: Acquisition

FIMS (Financial Information Management System)

Reason: DAFIS clone

FMS (Financial Management System)

Reason: Finance system

Information Architecture Database

Reason: Really just the architecture.

ITS.

Reason: Invoice tracking

LDR (Labor Distribution Report).

Reason: Not related to CM.

MIS (Management Information System, also ARA-MIS)

Reason: Not operational

NAILS (National Airspace Integrated Logistics Support)

Reason: Doesn't seem to be implemented yet, according to CIP.

NAS Document Handler

Reason: No longer exists

Oceanic Development Facility

Reason: Contains actual SW and related documentation of Oceanic systems under development. No real CM data in it, although it puts under CM developing Oceanic systems.

ODMS (Operational Data Management System)

Reason: Contains Notice to Airmen and "aeronautical data," including obstruction evaluation data.

RAPID (Rapid Aviation Program Interchange Database)

Reason: Acquisition

RTP (Resource Tracking Program).

Reason: Contains regional budget and project data for program and project managers. Used for F&E projects only. No specific CM data included.

SAM (System for Acquisition Management).

Reason: Purchasing system.

STAR (System for Tracking Acquisition and Real Estate).

Reason: Replacement of SAM.

Travel Manager

Reason: Does travel, not CM

INTERVIEW FINDINGS: EXPRESSED INFORMATION NEEDS

This appendix provides a summary of those needs specifically identified in on-site interviews. These needs are grouped to facilitate the development of future CMIM improvement plans.

Policy, guidance and standards.

- The nature and definition of CCB Authority (including the boundaries between NAS CCB, ANF CCB, IPT CCB and RCCB).
- The boundaries and responsibilities for NCP review and processing. Stakeholders need to know the leaders and followers for change processing.
- Updated and consistent FAA CM standards for operation (operational procedures) and standards for the management of information (i.e. electronic format for documents and drawings, drawing interchange standards). Standards should be imposed on FAA contracts to facilitate the management and sharing of information.
- Identify those Configuration Items and drawings that should be managed under CM in the Regions.
- Drawings must be recorded and shared with all participants.
- Policy that addresses the management of modifications (i.e. firmware modification changes and issues, audit process to verify that mods have been installed, training process to educate technicians and others on the value of mod tracking)
- Order 1100.127 for the SMO manager should include CM requirements, responsibilities and authority.

Information access (to currently available information)

- NAS Architecture, including SR-1000 documentation.
- CCB documentation (Charters, agendas, action items, decisions, etc.)
- List of the IPTs. This list should be linked to the IPDS Home Page.
- CM points of contact list.
- IPT must evaluator lists.
- NCP text throughout the review process to avoid duplicative comments and actions (should be more real-time versus serial). There have been cases where duplicative NCPs have been developed because DOCCON descriptions were not descriptive enough to know that a similar or same NCP had already been started through the corporate review process.
- NCP workflow process steps.
- Comments on casefiles through the process.

- Automating the currently paper-based Facility Reference Data Files (FRDF's) across the region would greatly aid in information access and availability.

New, currently unavailable, information needs

- Status of NCPs, Casefiles and CCD's as they are developed.
- Statistical data on CM processes to evaluate process effectiveness (e.g. processing time for an NCP, how many have been implemented, etc.) and to develop program metrics.
- Budget information in NCPs.
- Cost accounting information (how much are we spending on CM related activities?
- Quantification of CM benefits to the FAA.
- FAA vendor tools, processes and systems to ensure CM effectiveness across the board.
- Communication of CCD closure.
- Minimum set of CDRLs and DIDs for CM purposes, including ECPs, SCNs, NORs, FCA/PCA Audit Plans and Reports, status accounting CDRLs and DIDs, drawing packages, technical data packages and nameplates.
- Feedback from vendors when they execute modifications.
- Notification when mods have been released (when does the EEM or other change authorization get out?)
- Life cycle cost information for NCPs including the impacts of training, spares, facility, power, technical manuals and safety.
- Software patch history.
- Communication that the regional technician, AOS or vendor has in fact installed the mods.
- Documentation and tracking of usable spares inventories at sites.
- Standards are for web pages. Although much more information is becoming available, location of needed information and more web pages grows more complicated. Moreover, web pages are being designed to meet localized organizational needs. Improved corporate coordination/orchestration is needed.
- Clear responsibility for who should update DOCCON, particularly when system changes are made.
- Listing of available "as-built" drawings in each Region/Center
- Listing of CM information systems/sources.

Information Traceability

- Provide traceability of system and sub-system information throughout the life cycle in agency life cycle documentation (i.e. requirements, specifications, NCPs, ICDs CCD's, change authorization documents, and modification tracking systems.
- Provide traceability of configuration evolution not only to the system specification, but other requirements documentation (i.e. CONOPS, the NAS Architecture and other documentation).

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